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APRIL, 1951

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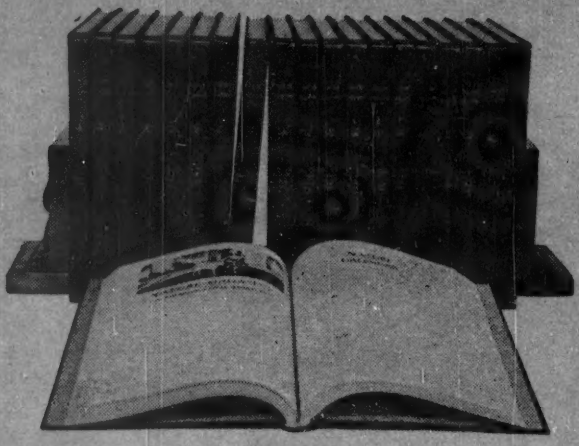

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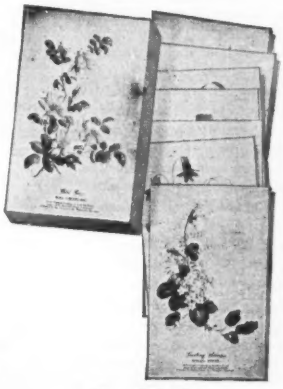

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Nature in Print

By HOWARD ZAHNISER

SHALL we continue to use science for our immediate needs, as a sort of glorified houseboy or handyman, while we let the future take care of itself?" asks Paul B. Sears in his recent *Charles Darwin: The Naturalist as a Cultural Force*. "Or," he continues, "are we at length in a mood to hear the truth about ourselves, to take science into our confidence, have it examine the books whose pages should be captioned — Man, Debtor . . . Environment, Creditor — in stalwart double entry?"

"In plain words," Dr. Sears asks, "are we ready to see ourselves for a moment through the wise, compassionate, and troubled eyes that peered out beneath the bushy brows and massive forehead of Charles Darwin?"

As I write these lines on the Lincoln's Birthday that is also the hundredth and forty-second anniversary of Charles Darwin's birth, and ponder Dr. Sears's rich and compact volume, along with Darwin's autobiography and certain letters as edited by his son and presented by George Gaylord Simpson, it is an easy thing indeed to agree with Dr. Simpson that "Darwin's character included such generosity and selflessness as to warrant calling him a saint of science."

So reverent are we becoming as we contemplate Darwin's writings, his character, his influence on our lives, and the implications to us of his interpretations of life. His influence is, indeed, as Dr. Sears has viewed it, one of the great — and good — cultural forces of our time.

We can do no better in approaching Charles Darwin in such a spirit — either for a first time or for a renewed appreciation — than to read his own autobiography. A model at once of candor and modesty, it occupies less than 60 pages in this volume of publisher Henry Schuman's "Life of Science Library," which Mr. Simpson has introduced. With the 40-or-so-page essay that follows, entitled "Reminiscences of My Father's Everyday Life," by Sir Francis Darwin, and the 200 and more pages of Charles Darwin's personal letters, which pertain to his writing of the *Origin of Species* and which make up the body of the volume, we have a most favorable opportunity to see Darwin as a man.

It is of interest, and of value in inducing that personal sympathy essential for any true understanding of a man, to read of even the incidentals that he or his son found worth recording. For many of us there is great interest of this sort in reading Sir Francis Darwin's accounts of his father's difficulties in handling correspondence. ("He had a printed form to be used in replying to troublesome correspondents, but he hardly ever used it; I suppose he never found an occasion that seemed exactly suitable.") And there is, potentially at least, great value to us in reading Darwin's own statement, in the autobiography: "I have as much difficulty as ever in expressing myself clearly and concisely; and the difficulty has caused me a very great loss of time; but it has had the compensating advantage of forcing me to think long and intently about every sentence . . ."

It is interesting to read Charles Darwin's comment: "Music generally sets me thinking too energetically on what I have been at work on, instead of giving me pleasure." It is interesting also to read his statement that novels, "a surprising number" of which were read aloud to him, were "a wonderful relief and pleasure." There is more than interest, there is indeed a warning, in his confession of a loss of taste for the poetry, "such as the works of Milton, Gray, Byron, Wordsworth, Coleridge, and Shelley," which "up to the age of thirty" had given him "great pleasure." Pondering this as he looked over his life while writing the autobiography, he commented: "If I had my life to live again, I would have made a rule to read some poetry and listen to some music at least once every week; for perhaps the parts of my brain now atrophied would thus have been kept active through use. The loss of these tastes," he wrote, "is a loss of happiness and may possibly be injurious to the intellect, and more probably to the moral character, by enfeebling the emotional part of our nature." So nicely the scribe honors poetry and music.

To those of us who are concerned with national parks and other wildernesses for their preservation of the primeval, it seems significant that Darwin, in the retrospection of his autobiography, valued most highly his experiences in such presences. "The glories of the vegetation of the Tropics," he wrote, "rise before my mind at the present time more vividly than anything else; though the sense of sublimity, which the great deserts of Patagonia and the forest-clad mountains of Tierra del Fuego excited in me, has left an indelible impression on my mind." In his youth, he remarked a few pages earlier, "a vivid delight in scenery was first awakened in my mind, during a riding tour on the borders of Wales, and this has lasted longer than any other aesthetic pleasure."

One is reminded of the chapter entitled "Retrospect" in the journals of Darwin's famous voyage on the *Beagle* and his comment there, four pages from the end of the book, that, "among the scenes which are deeply impressed on my mind, none exceed in sublimity the primeval forests undefaced by the hand of man; whether those of Brazil, where the powers of life are predominant, or those of Tierra del Fuego, where Death and Decay prevail. Both are temples filled with the varied productions of the God of Nature."

One is in turn reminded of the very closing paragraph of the *Origin of Species*, wherein Darwin testifies again to the regard for life which was his. "It is interesting," he there wrote, "to contemplate a tangled bank, clothed with many plants of many kinds with birds singing in the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. . . . There is grandeur in this view of life," he declares, and more and more of us are appreciating this — the grandeur of the concept of the interdependence of living creatures in perpetuating the wonder that is Life.

It is a renewed and enlightened sense of this interdependent existence and persistence of life that is the outstanding experience in reading Dr. Sears's contribution to Scribner's "Twentieth Century Library." In a chapter entitled "The Living Land-

Incredible Spring

By ALICE FRANKLIN BRYANT

Always I love spring's warm luxuriance,
And multicolored magic mantle spread
Kindly to cover the bereft expanse
That winter has despoiled and left as dead.

Wild bluets, growing for a child to pluck;
Nectar to taste; the scent of myriad flowers;
To find wee eggs in hidden nests — what luck!
My wonder overflows in sun-filled hours.

The years flee, and spring's high artistry
Delineates young love. Bright other eyes
See all the wondrous world anew for me
Flooded in splendor of a fresh sunrise.

To taste of future life were not more strange
Than living through each year of birth and change.

scape," in which Dr. Sears's own peculiar contribution to our understanding of Darwin seems most apparent, it is pointed out that Darwin "was a great pioneer in a field of science which had not even been named when he wrote the *Origin*. That field has to do with life in all its interrelations with environment, and is called *Ecology*." "Darwin's work has made it impossible," he explains, "except as a provisional device, ever again to think of life as something apart from environment."

It would seem inevitable that a thoughtful person (or a thoughtful people), having been led thus far, would go on to a realization of a responsibility to the environment; in other words, becoming converted to conservation. Dr. Sears in this work on Darwin, as in his other works — the now famous *Deserts on the March*, the too-much-neglected *This Is Our World*, and the later work, *Life and Environment* — leads the reader along promptly to this end. "As a chain is no stronger than its weakest link, if any one of half a hundred of the requisite conditions for abundant life be too scantily met," he warns, "by so much will the capacity of a landscape, measured by the communities upon it, be reduced. The unique qualities of life, e\ of human life, do not supersede the physical verities," he declares, and concludes: "This fact we ignore at our peril."

"Grand, comprehensive, and illuminating as Darwin's conception of evolution is, it comes to its fullest fruit," Dr. Sears believes, "only when we see it as an expression of the great principle of dynamic equilibrium. Our highest opportunity for eventual human freedom and dignity lies precisely in the fact that we are the products of evolution. As responsible units in the great web of life we can be guided by an infinitely long inherited experience, built into our bodies and minds and shaping our decisions in the interest of our own species."

It is the peculiar value of Dr. Sears's extended essay that it does help us to see Darwin's conception in this light. Other values this volume certainly has also, for it is a well-rounded consideration of Darwin's pertinence to us. As to the Darwinian evolution theory itself Dr. Sears's summary is as clear as the theory was simple.

"The thesis," as Dr. Sears expounds it briefly, "was simplicity itself. No two organisms are precisely alike. The powers of reproduction far exceed the capacity of the earth to sustain the organisms produced. Relentlessly and inevitably many perish, few survive. By a process as impersonal as the law of gravity there is a natural selection of those which — by their favorable qualities — are best fitted to survive. Those unfitted are eliminated at once, along with a large proportion of those whose fitness is indifferently good. The fittest which survive and reproduce transmit their characteristics."

With similar helpfulness to understanding, the implications and influences of Darwin's several contributions are discussed and interpreted. "Charles Darwin did not kill the faith of mankind," avers Dr. Sears in his concluding paragraph. "He wrought mightily, and others with him, for a newer and greater faith — faith in universal order, whose secrets open themselves to men truly free to question, to communicate and to arrive at agreement as to what they have seen."

This recalls also the conclusion of Dr. Simpson's introduction to this other volume:

"Beyond any particular question of fact or error in his work, Darwin was also a hero in the long human struggle for freedom of inquiry and the dignity of man. . . . The battle continues, but Darwin's life and work are there to inspire those who really believe in freedom and in mankind."

On April 19, 1882, Charles Darwin died — sixty-nine years ago — but his influence lives on, and his significance is assuredly pondered with profit in the reading of such works as these two which it is our good fortune to have now at hand.

Charles Darwin: The Naturalist as a Cultural Force. By Paul B. Sears. New York and London: Charles Scribner's Sons. (in the Twentieth Century Library). 1950. 124 pp. (5½ by 8¼ in.), with index. $2.

Charles Darwin's Autobiography. With His Notes and Letters Depicting the Growth of the ORIGIN OF SPECIES. Edited by Sir Francis Darwin. New York: Henry Schuman (in the Life of Science Library). 1950. 266 pp. (5½ by 8½ in.) with an introductory essay on "The Meaning of Darwin" by George Gaylord Simpson, frontispiece portrait, and index. $3.50.

Education of Man

The Education of Man. By Heinrich Pestalozzi. With an Introduction by William H. Kilpatrick. New York. 1951. The Philosophical Library. 93 pages. $2.75.

Johann Heinrich Pestalozzi lived from 1746 to 1827 and was, in his time, the world's most acclaimed teacher of the young. Historically, he is regarded as having had the most significant influence on the educational pattern, changing its aims and procedures. He carried a spirit of equality of opportunity and respect for human personaltiy into the schoolroom. This little book is a collection of aphorisms from the writings of this educator, and we cite one that is penetrating in the light of ecological thought today. Pestalozzi wrote: "All that happens in Nature is everlastingly interwoven. Yet, save for a few traces, the secret of Nature's threads, of her warp and woof, of her ultimate ends, is hidden from us. Consider the spider as she spins her web, and compare her art with that of man. You will find that to the spider the Creator gave her art entire, while to man he gave but the bias." Since Pestalozzi's day man has been discovering some of the secrets of "Nature's threads," but many still elude him.

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By Way of Report

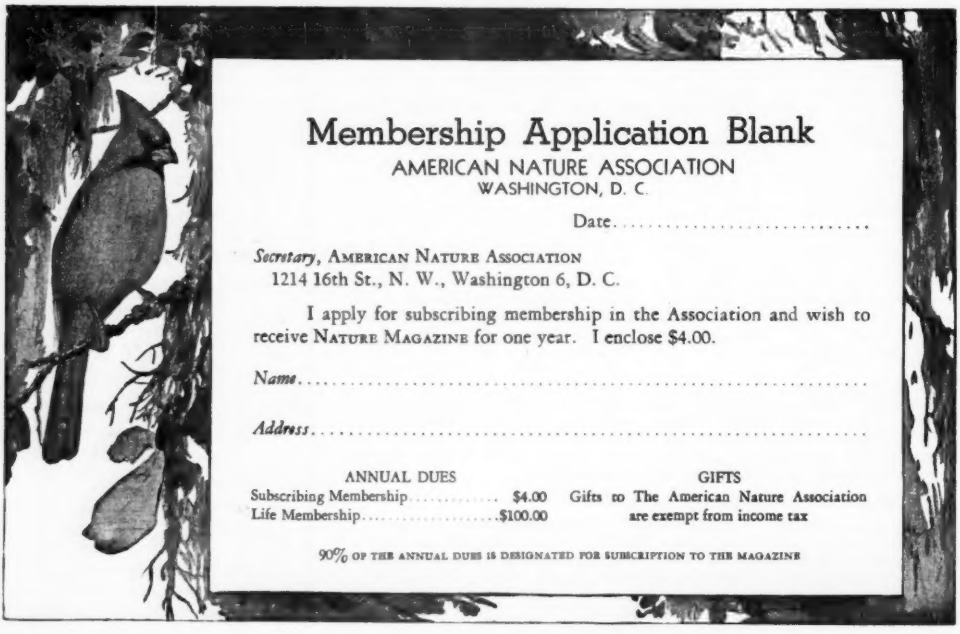
"SAVE Bergen Swamp" was the title of our editorial in the December, 1950, issue of *Nature Magazine*. We presented briefly the work of the Bergen Swamp Preservation Society in behalf of this outstanding area, and indicated the need of a maximum of twenty thousand dollars to complete the acquisition of the reservation. We were delighted to receive word from H. E. Clements, treasurer of the Society, that our championship of Bergen Swamp had brought one anonymous donation of $2500 and a number of smaller gifts. The members of the Society are deeply appreciative; and so are we!

JOINING with other conservation organization, the American Nature Association collaborated in the production of the folder "Will You Dam the Scenic Wild Canyons of Our National Park System?" This has particular reference to the proposed dams in Dinosaur National Monument, and copies of this leaflet are available on request. Secretary of the Interior Chapman has approved the Echo Park project, along with three other dam proposals. These will aggregate six hundred million dollars in cost, a sum difficult to reconcile with the demands for slashing non-defense appropriations under emergency stress. Congress will, of course, have to approve the projects and vote the money before they can be started.

APPROVAL by the Secretary of the Interior of an order withdrawing 35,200 acres of the Los Padres National Forest from all forms of appropriation under public land laws, with certain exceptions pertaining to gas and oil, assures protection of the California condor. At the public hearings held on the withdrawal proposal the American Nature Association was one of those presenting a brief in support of the plan. As a consequence we take special pleasure in announcing the success of the program.

H. E. Radcliffe, vice-president of the American Nature Association, represented the Association at the sessions of the Sixteenth North American Wildlife Conference held in Milwaukee March 5 to 7. He also attended sessions of the Natural Resources Council of America, of which he is treasurer, and of the National Wildlife Federation.

FOR many years the American Nature Association has made a special grant to Cornell University to provide fellowships for graduate students specializing in Nature and Conservation education. The grants have been renewed for 1951. Many important studies have resulted from these grants, and much valuable information assembled. Some of these data have appeared in special articles in educational and conservation publications; one study book for me.



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Contents Noted

RESIGNATION of Newton B. Drury as Director of the National Park Service has been received with regret and alarm by many conservationists, ourselves included. There is regret at the loss of a fine public servant who for nearly eleven years has been devoted to the integrity of the areas that it has been his responsibility to administer. There is alarm because Mr. Drury's resignation was not voluntary, and because there is increasing evidence that the current policy of the Department of the Interior is weighted on the side of exploitation and development. We are certain, of course, that Arthur E. Demaray, his successor, is devoted to National Park ideals, and that he and his staff will defend these ideals. We offer any aid within our power in the face of a departmental trend that we regard as dangerous and short-sighted, however politically expedient it may seem on the surface.

IT WAS in 1924 that we first met Newton Drury. He was then the fighting executive secretary of the Save-the-Redwoods League, working to preserve representative and substantial stands of the incomparable California redwoods from the axe and saw. We roamed the redwoods of Bull Creek Flat and points north with him, and have always treasured that experience. When Horace Albright resigned as Director of the National Park Service to enter private business, the then Secretary of the Interior, Harold L. Ickes, asked the National Parks Advisory Board to recommend the man in its opinion most competent to head the Service. The unanimous choice was Newton B. Drury. He declined because of the challenge then facing him in the redwood problem and the California parks program. Later, when the office of director again became vacant, Mr. Drury was once more urged by Mr. Ickes to accept the appointment. This time Mr. Drury accepted, after being convinced by the persuasive Mr. Ickes that it was a public duty.

SINCE August, 1940, Newton Drury has served the American people well as chief trustee of incomparable parts of the American outdoors that are the people's property. He saw the parks through the war period with wisdom, enjoying Mr. Ickes' cordial collaboration in so doing, and these areas emerged from this trying time virtually unimpaired. He successfully led the fight against subsequent attempts to encroach upon the parks. Most recently he was called upon to present, at a hearing called by Oscar L. Chapman, Secretary of the Interior, the case against the proposed invasion of Dinosaur National Monument by the construction of Echo Park and Split Mountain dams. It was a strong case, ably presented, but was opposed by an impressive parade of western members of the Congress. Later Mr. Chapman decided against the National Park Service and in favor of the Bureau of Reclamation.

WHETHER Mr. Chapman expected his decision on the Dinosaur National Monument to settle the matter we do not know. So far as conservationists are concerned, it certainly did not. So far as the National Park Service is concerned, it did. The decision of the Secretary established departmental policy, and we can testify personally that Mr. Drury and his staff were most punctilious in this regard. But conservation organizations were not affected by any such bureaucratic gag rule, and publicity against the Dinosaur dams increased. Whether Mr. Chapman laid this at Mr. Drury's door we do not know, but we would like to make the record clear.

IT IS to us significant that the official release announcing Mr. Drury's resignation was innocent of the usual expression of appreciation by his superior for distinguished service. Mr. Chapman is apparently not a hypocrite, but the absence of any such sentiment is ample substantiation — if any were needed — of the involuntary character of the resignation. The Director of the National Park Service had been offered a nebulous and ill-defined position as special assistant to the Secretary, at a lesser salary. Decision was asked immediately, otherwise his resignation would be accepted as of January 15. More often than not these "special assistant" posts are equivalent to moving the official's desk right next to the front door so that he can be eased out quickly when the time comes. We have heard this device described as "Potomac fever," and at least it is an insidious and debilitating malady. Nobody seems to attain an immunity to it, and Mr. Drury did not elect to expose himself to the unfilterable virus that causes the illness.

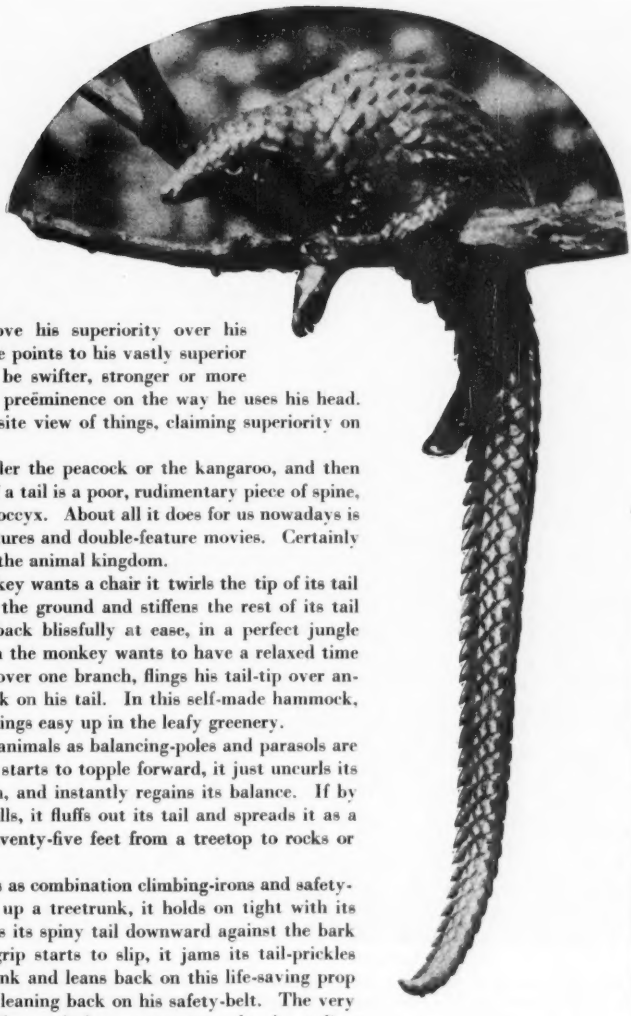
WHILE we are keeping the record clear, and in view of national publicity, we must also say that Mr. Drury had no knowledge of the fact that conservationists had carried the case to the President. The Director had gone to California for the Christmas holidays when this initiative was taken, and he was dismayed when he returned to find out what had been done. In taking this step it was realized that it would not alter matters so far as the Secretary of the Interior was concerned. It was, however, felt that Mr. Drury was entitled to conclude his term of office with somewhat more leisure than apparently had been the desire on high. This, at least, appears to have been accomplished. Mr. Drury, of course, has distinct distaste for being placed in the position of a martyr, and we hope that championship of him personally will not be so regarded. Quite likely he will enjoy release from bureaucratic responsibilities, and welcome an opportunity to return to his beloved California. We will miss him, and we wish him well.

R.W.W.

Kangaroo boxers have an advantage over the human kind equipped with only two legs. The kangaroo uses its strong and efficient tail as a third leg and firm prop as it trades punches with another combative native of Australia. The long tail also serves as a balancing pole as the animal bounds along with amazing rapidity.

Tails — Means to Many Ends

By ALAN DEVOE



WHENEVER man wants to prove his superiority over his friends in the animal world he points to his vastly superior head. Other creatures may be swifter, stronger or more handsome, but man rests his claim to preëminence on the way he uses his head. Animals could properly take the opposite view of things, claiming superiority on the basis of their *tails*.

Looking squarely to the rear, consider the peacock or the kangaroo, and then consider man. All that man has left of a tail is a poor, rudimentary piece of spine, four or five vertebrae long, called the coccyx. About all it does for us nowadays is to add to our suffering during long lectures and double-feature movies. Certainly it is the poorest excuse for a tail in all the animal kingdom.

When a South American woolly monkey wants a chair it twirls the tip of its tail into a loop, plants the loop firmly on the ground and stiffens the rest of its tail into a rigid column. He then leans back blissfully at ease, in a perfect jungle version of a streamlined rocker. When the monkey wants to have a relaxed time in the treetops, he curls his hind toes over one branch, flings his tail-tip over another branch behind, and then lies back on his tail. In this self-made hammock, the monkey swings for hours, taking things easy up in the leafy greenery.

Tails are as important to tree-living animals as balancing-poles and parasols are to tightrope walkers. When a squirrel starts to topple forward, it just uncurls its heavy, bushy tail, thrusts it out astern, and instantly regains its balance. If by any chance it misses its footing and falls, it fluffs out its tail and spreads it as a parachute. A gray squirrel can fall seventy-five feet from a treetop to rocks or frozen earth without getting hurt.

Tree-climbing anteaters use their tails as combination climbing-irons and safety-belts. As the anteater inches its way up a treetrunk, it holds on tight with its knees, like a boy shinnying, and presses its spiny tail downward against the bark to give it added push-up. If its leg-grip starts to slip, it jams its tail-prickles into fixed positions against the tree-trunk and leans back on this life-saving prop for all the world like a window-cleaner leaning back on his safety-belt. The very few tree-animals that do not have tails — sloths, orang-utans, the Australian

The tail of the pangolin, an African scaly anteater, serves this animal as a door. Although the pangolin wears a protective armor of scales, its under side is vulnerable. So when it goes into its burrow it wedges its biteproof tail in the doorway and serenely goes to sleep.

Anteaters' tails are important equipment. Tree-climbing species use their tails as combination climbing-irons and safety-belts. The anteater at the left uses its tail as a prop as it indulges in a meal of termites in the teeming nest.

PHOTOGRAPH BY WALTER J. SCHOONMAKER

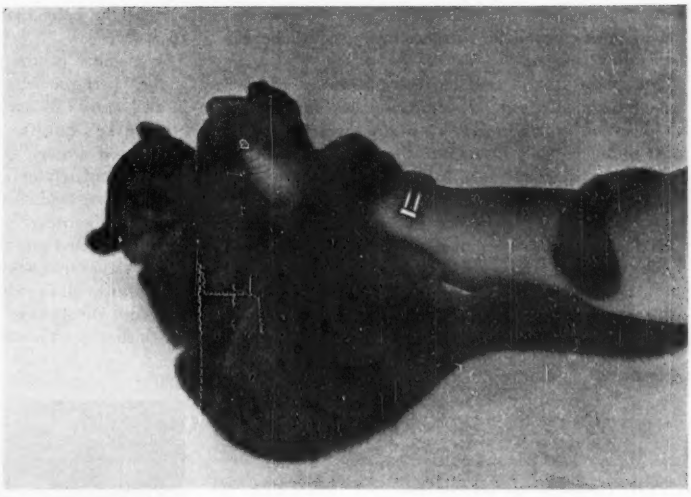
The white-tailed deer doe looks, startled, at the photographer. Her tail is down, but quickly will flash into warning position, the white flag wigwagging to others that human danger is nearby.

koala bears — all show by their gingerliness and cumbrous slowness how indispensable tails are to carefree tree-living. Perhaps the most indispensable tail of all in the tree-world is a honey bear's. The honey bear, or kinkajou, raids beehives and birds' nests. To get at them, it lowers itself by its long tail from a branch above. If the enraged bees or birds catch the kinkajou in the act, it just whirls around and climbs back up its own tail!

Tree animals do not use their tails just for the special needs of arboreal living. We can see lots of other ingenious tail-tricks by watching common squirrels in action. A squirrel's tail, in addition to being balance-pole and parachute, is so many other things that a squirrel would be completely lost without it. In cold weather the squirrel wraps its tail around it and uses it as a blanket. If the squirrel sees danger in the offing, it silently tips off its fellow squirrels by flipping its tail in a warning ripple. When a squirrel is hard pressed by a pursuing enemy that seems about to make a fatal pounce, the squirrel sticks its tail out as far backward as it will go. Hardly any predatory animal can resist that teasing temptation. The pursuer is goaded into making an instant pounce, prematurely, and is still picking tail-fur out of its teeth while the unhurt squirrel has gone whickering gaily up the nearest tree. Do you like to eat apples? Messy, aren't they? A squirrel can not very well go wash its lips and face every time it gets sticky with apple-juice. It just flips its tail around to the front, picks it up in its paws, and dapperly wipes itself clean with a furry napkin.

Many animals use their tails to give signals. A doe, by flipping up her white signal-flag as she bounds away through the thicket, tells her fawn "This way! Follow me!" Where there are deer-crossings over highways, the lead-deer flashes Stop and Go signs to others by wigwaggings. We do not have to believe the old woodsmen's whopper that a fox tells another fox which way the hounds went by pointing with its tail; but the tail-signalling ability of beavers is as true as it is astonishing. A beaver's tail is flattened sideways, and spreads out like a paddle. When a lookout beaver spies danger, it runs to the water's edge, lifts up its big flat tail, and slams it down — *smack!* — on the water. This resounding and unmistakable alarm signal sends every beaver in the neighborhood scurrying to safety. The beaver uses its tail for a rudder when swimming, as a portable camp-stool to sit on while gnawing trees, and a kind of third leg to keep it from toppling over when its front paws are full of mud and it has to walk around in an erect position, man-fashion.

Some tails are used as weapons or hunting equipment.



The kinkajou, or honey bear, depends on its tail to hold it while it raids bee hives or birds' nests. Here the tail instinctively curls around an arm as the little animal clings to a hand.

PHOTOGRAPH BY FRANKLIN I. JORDAN

An alligator or crocodile can flatten and sometimes fatally injure a man with one sideswipe of its tail. African antbears can deliver telling wallops the same way. Probably the most extraordinary use of a tail as a hunting-accessory is the amazing performance staged by fox sharks, often called "thresher" sharks. Common in both northern and southern hemispheres, the thresher shark's favorite food is herring. When a thresher shark catches up with a shoal of herring, it glides up near the surface of the water and begins violently lashing and beating it with its tail. At the same time, it swims around the herring in a great circle. Around and around the shark goes, beating the water with its tail, driving the herring toward the center of the churning circle. Then, little by little, the shark narrows the circle. *Thwack-thwack-splash!*, the flailing tail herds the herring together as a shepherd rounds up his flock with cracking whip. Finally, when the small fish have been tail-whipped into a compact huddle, the thresher swoops in on them and gorges. When there is an especially big shoal to be handled, two threshers sometimes team together in the roundup, their tails beating the sea into intricate patterns of diminishing circles of boiling froth.

Perhaps the strangest use of a tail is made by the pangolin, a scaly anteater found in West Africa, which uses its tail for a door. The pangolin wears a protective armoring of dragonlike scales on the upper part of its body, but, like a porcupine, it is vulnerable on its underside. To protect itself from intrusion while it sleeps in its burrow it retires with particular care. Unlike other burrow-dwelling animals, it sleeps facing *into* the burrow. As it settles down, it stuffs and wedges its heavily scaled, biteproof tail into the burrow's entrance, stopping it up completely. Safe inside the impenetrable armored door, it goes serenely to sleep.

Closer to home, the animals around us also put their tails to good and ingenious use. A mother cat trains her youngsters with her tail. Slowly twitching the tip of it, she entices the kittens to pounce and catch it, thus teaching them the lore of hunting. The tail of a common house mouse can be more than a help in balancing and climbing. It is a miniature elephant's trunk, in reverse. Suppose a mouse has found a bottle of ketchup. When the mouse has nibbled away the cork, it may sit itself down on top of the bottleneck, carefully lower its tail down inside, and haul up the delicious stuff, dripping tailful by tailful, the way a man hauls a bucket up out of a well. In all the woods of the world there is not a more delightful sight than a mother opossum taking her children for an outing. She curls her long tail up over her back. The youngsters climb aboard and hold tight to the proffered tail.

The squirrel's tail serves various important needs of arboreal life. It is balancing pole and blanket, parachute and warning device. Here a squirrel balances itself on the edge of an opened coconut while it feeds on the white meat.

Mother 'possum goes trundling off through the woods and treetops carrying an entranced cargo of wide-eyed little strap-hangers.

One of the longest tails on record is owned by the Japanese phoenix-fowl. A one-pound bird may sport a tail seventeen feet long. One of the shortest — and most useful — tails belongs to the baby copperhead snake. A baby copperhead is born with a coat of protective camouflage from its head to all except the tip of its tail, which is an arresting sulphury yellow. When the baby copperhead is hungry, it lies very still, perks up the tip of its tail, and wiggles it. While the rest of the little snake's body is almost invisible, the wiggly little tail-tip appears to be a tempting grub. It lures unwary frogs and similar small creatures close enough so that the baby snake can whip around and catch them.

A member of the lizard family, the little "glass-snake," performs what is perhaps the neatest tail-trick in all Nature. When an enemy grabs hold of a fleeing glass-snake's tail, the snake is not slowed up a bit. It gives itself a quick shake and a twist, and, in an instant, completely detaches its tail from its body. The enemy is left holding the abandoned tail — which goes right on "fighting" — while the glass-snake scoots safely away and promptly grows a new one.

The things that animals can do are limitlessly surprising. But in all the animal creation there are few more ingenious things than — so to speak — the means to which they put their ends.

More and Better Trilliums

By EDWIN F. STEFFEK

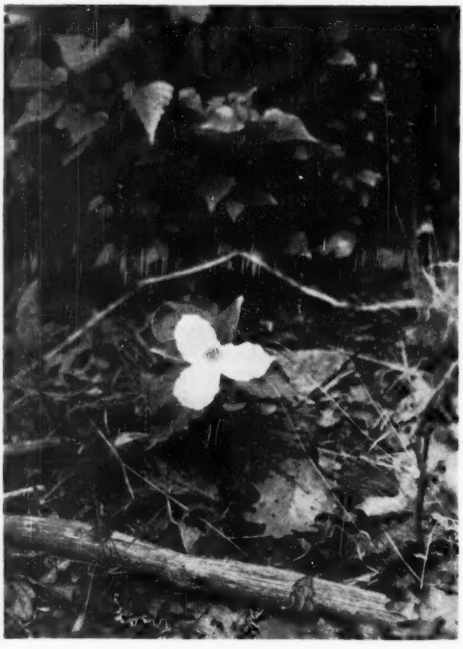
THE snow trillium, *Trillium grandiflorum*, is one of our showiest spring wild flowers, and it suffers as a result from thoughtless picking. Once the plant was common in rich woods from Quebec to Minnesota, and south to North Carolina and Missouri. Now it is rarely seen except in the rougher places away from the centers of "civilization."

However, trillium is one of the easiest of our wild flowers to propagate and grow. It comes from a stout, more or less bulbous rootstock about six inches below the surface. It is not too fussy about soil, doing well in most mixed hardwood or partly evergreen areas where the soil is not too strongly acid. When well established it will bloom for years, but that does not mean that you can pick the flowers. The flower stems are short, and picking the flowers means taking the leaves, too. This robs the plant of its food-making factories and seriously weakens it for the following year.

Each year, in April or May, the beautiful, three-petaled, white flowers unfold above the broad leaves, which also come in threes. The flowers are long-lasting if left undisturbed, and eventually turn to pink as they age. The fruit is a slightly six-lobed berry, three-quarters to one inch in diameter.

From a landscape standpoint the snow trilliums look best grown in large colonies. They are particularly effective in front of flame azaleas, with which they bloom. After flowering and maturing their seed, the plants die down, generally about mid-July, until the next year.

Snow trilliums may be moved at almost any time of year if the plants are not disturbed in their growth, but early fall is best. Mulch with leaf mold, peat moss or other material, especially the first year, and add to the supply of this nourishment, a little each year.



New plants are readily grown from seed sown in a protected place and not allowed to dry out. Generally, the seed will not sprout until the following spring, and often no growth appears above ground for another year. However, a much faster way is to injure the bulb. One way to do it is to decapitate the bulb after flowering. Then replant both halves. New little bulbs will usually form at the points of injury and may be removed by fall, and certainly by the next July. Plant them in a rich, woodsy soil and in a few years they will make large, vigorous plants.

Thus, you can produce plenty of plants for your own use, and some extra ones to restock other woodlands.

Lost in Wonder

By J. L. HOWE

Illustrated by Clarence Tillenius

IT WAS a clear sunny morning in southeast Alaska, an occurrence so rare in that region that it took on the aspect of an event. It revealed such a multitude of details in the landscape that it assumed the nature of a spectacle, as I turned from the path leading up along the side of the stream.

Behind me lay the sleepy village with its plank streets that served both as sidewalk and highway, its single store, and its houses that seemed to cling precariously to the side of the slope. Some of the walls of the buildings were propped with long poles, as if in naive and indolent recognition of their decayed and rickety condition. Beyond these lay the wharf and the blue bay. The village was deserted, except for a few of the older natives. A single curl of smoke drifted from a chimney at the farther end of the "street." The creek tumbled, glistening with spray, to the beach.

Across the bay, to the westward, lay two islands, closely wooded and ringed with narrow strips of beach, which disappeared almost entirely at high tide. Through the channel between these two islands, smaller islets looked like clumps of shrubbery adrift on the sea.

"About one hundred yards ahead, stood one giant spruce. . ."

Over all was the sunshine, mystical, soft, and peculiar to humid Alaska. There the sun never glares at the landscape with that merciless stare with which he often peers at the plains. Perhaps the almost-moist atmosphere mellows its rays to tenderness. But whatever the explanation, the result seemed the most delicately executed of all lighting effects. As I left the edge of the town for the forest, spruces, hemlocks, and magnificent cedars lined the path and tempered the sunlight to lofty dimness.

About one hundred yards ahead, stood one giant spruce. Some forty feet in circumference, twelve feet above the ground, the tree was as straight as a sunbeam, bare a long ninety feet to the first limb. Another hundred feet higher, the spruce lifted its proud head into the sunlight. It made one sad to think of the day when the lumberjacks would lay this proud giant on the mossy earth, and the steel donkey would drag it ruthlessy down the valley to be floated away to a mill, where a saw would rip it into a thousand strips. Some day the tree's light, tough fiber might be built into airplanes to carry freight, passengers, and mail over these same valleys and the north Pacific to the Orient.

Farther on stood a grove of hemlocks. I had worked in the pine and hemlock forests of Pennsylvania, but hemlocks like these did not grow there. Smooth and straight, they looked as though they were stretching to the limit to get their tops out into the sunshine. Yet the day would come when these princely trunks would become dimension stuff — perhaps the frame work for houses and barns on the prairies of South Dakota or Nebraska. For civilization is a devastating process that strips the riversides of trees and shrubs, buries the flowers in the meadow, and saps the land of its life-giving substance.

I wandered on deeper into the forest. The path faded out, leaving me to pick my way through the underbrush, secure in the knowledge of the way I had come and with blithe innocence as to directions.

My destination was a growth of yellow cedar, which I had never seen but which I had often heard the natives mention as "growing far back from the water." Yellow cedar is used for boat-building since it resists decay and the gnawing jaws of the teredo. My route led me past other cedars six to eight feet in diameter, timber that will some day be priceless in value. They scented the forest with the delicate perfume of the dressing room of a princess. The rare beauty of Solomon's temple derived part of its frame from wood of this kind. Here, indeed, was a woodsman's paradise. For centuries, unmolested, Nature had added ring on ring of the finest growth to trees of her own planting, to produce a forest of unsurpassed beauty.

From an open spot I could see green of a different shade far across the valley. This, I thought, must be the cedars sought by the boat builders, so I hurried on. Every valley in this part of Alaska has its stream of crystal-clear water. The place where I chanced to meet

this stream for crossing revealed what seemed to be an eddy, fifty or sixty feet in width. A number of alder trees, some of over twelve inches through, lay with their tops toward the water, for here was a beaver colony.

Several trees were partly cut; others were lying just as they had fallen. But the chiseling wood cutters had made one bad mistake. One tree had lodged against the branches of another. Three or four pieces about three feet long had been cut off, and some of them had been rolled to the bank of the stream, evidently ready for use in the dam that was under construction.

A study of this dam gave me a weird feeling. During the rainy season, with the snows melting on the mountains, the water in such streams flows with considerable current. To meet this situation the dam had been built in a curve, with the convex side up stream, just as an engineer would plan it. The logs had been placed in such a way as to insure the greatest possible strength. And, mysteriously, only alder was being used. The beavers were putting into the dam only its scrubby, crooked trunks, passing up the long, slender spruce and hemlock that grew close to the bank of the stream, and which could have been secured with much less effort. The fiber of the alder is somewhat more soft than that of the hemlock and spruce, and consequently more easily worked. But these tireless, furred lumberjacks are not lazy; they are efficient. The reason for the choice of the alder seemed evident from what could be observed in the older part of the dam. The logs that had been placed in the bottom and at the side had sent out new shoots, which had taken root and were growing into new shrubs. These new growths were sending their roots down into the bottom of the stream and into its banks, effecting a more secure anchorage than either rock or cement.

The beaver houses were built above the dam with the same care, but they were too far from shore and too deep in water to permit me to see the details of their construction. However, the tops of the houses and the breast of the dam were covered with a mixture of clay and earth, which in winter would freeze into a crust as solid as brick. Under his frozen roof the beaver is safe from the depredations of wolves, the perennial enemies of this land-water animal.

Fortunately a fallen sprice furnished me a comfortable footbridge to cross the stream, a short distance below the beaver dam. I hastened on, hoping still to find some yellow cedars. The valley was wider than I had thought. Soft ground and underbrush made walking difficult. Grass in one area of about two acres spread out like an immense rug of pale green. Around its edge, where the trees stopped and the moss began, was a border of spreading ferns. Magnificent trees stood like guards over this unoccupied territory, as if waiting jealously until the chemistry of Nature had provided food and anchorage for their roots. The mossy carpet responded in soft silence to every step. I was in a land of dreams.

Suddenly something struck me with the quickness of a rifle shot. It was not a bullet, an arrow, or a club; it was quicker than any of these. It was an awareness — "I am lost." Only those who have experienced it know the horror that darkens the mind with that realization. Fear of the unknown and the untried is aggravated a thousand-fold when the unknown is in a trackless wilderness that offers no sign of a way of escape.

My first feeling was one of panicky fear. The thought of starving to death, or being the prey of hungry wolves, made the cold sweat stand out. My heart pounded. Perhaps no human being had ever before set foot where I was standing. There were no blazes, no signs, no markings of any kind. Clouds now hid the sun. The only direction I was sure of was straight up, or down. Cold

The beavers were putting into the dam only the scrubby, crooked trunks of the black alder.

"Two bald eagles sat silently far up on the top of a dead spruce, symbolic of the solitude of their native environment."

rocks stared at me from the side of the mountain. The great trees seemed no longer friendly, but to mock me in my helplessness. The wind, which shortly before had made sylvan harps of their branches, now spoke in whispers of my plight. Two bald eagles sat silently far up on the top of a dead spruce, symbolic of the solitude of their native environment. Somewhere a wolf voiced a hair-raising howl, to be answered by half a dozen of his kind on the opposite side of the valley. Several ravens flew up from what these animals had left of a doe, their raucous caws deepening my dismay.

A sense of utter helplessness seemed to creep over my whole body. I recalled stories I had heard of men who had been lost in these forests. Like merciless imps, the details of those accounts seemed to hammer and batter at the doors of my mind until every mental image was filled with fright. I sat down in an effort to get control of myself and to decide what to do.

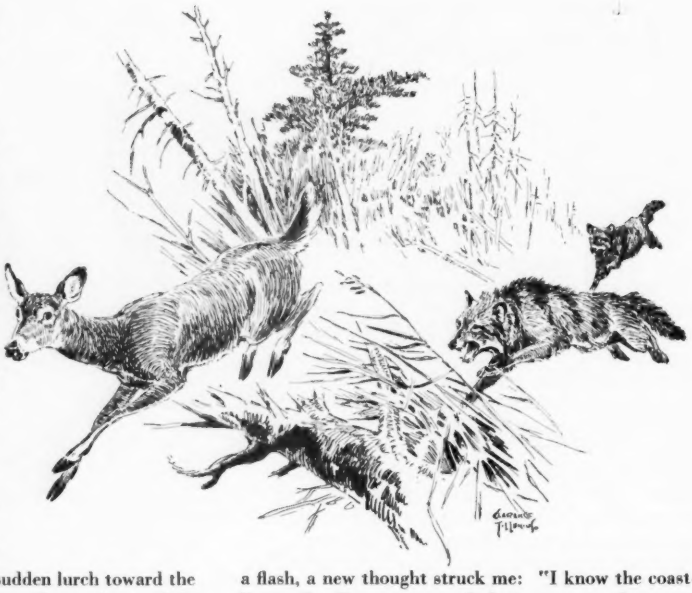
The murmur of the breeze in the treetops brought back the plaintive voice of Edwin Scott, my near neighbor in the village, telling again of the man from the States who came to old Howkan to spend his vacation. Shortly after his arrival at the village he rowed across to Dall Island to hunt deer. Nothing was ever seen of him again. Searching parties scoured the mountain sides and raked every valley, but no trace of the man was ever found. Then I thought of the last rites I had performed, a few days ago, over what was left of a bootlegger, who, pursued by the law, sought safety in isolation. When he was trying to escape the law, the wolves got him — that is, all except what they could not get out of his rubber boots. I could hear those bones rattle in the homemade wooden box, as the men who carried it stumbled over the rocky beach when carrying his remains to the burying ground.

Emotions rise and fall like the tides, and, as I began to recover from the first wave of fear, I remembered the common belief that a person when lost travels in a circle. "Why wear out my strength, therefore, going and going just to come back here?" What association could have brought back a college classroom experience of so long ago, I will never know, but whatever it was, it proved to be a magic charm. A psychology professor told our class that an emotion could not be studied introspectively; that whenever the mind turns itself inward on a feeling, the emotion almost instantly disappears — it just fades out and is no more. If anyone ever had a favorable opportunity to test such a theory I had — unless the thought of its utter foolishness would keep me from trying it. Could anyone shake himself out of the terrific mental strain I was in by merely shifting the direction of his thoughts? Impossible!

Then I began to question myself: "Just what is going on inside of you? Is this purely a mental experience, or is the riot of consciousness accompanied by bodily changes? Or can I catch myself in the act of being afraid?" A few things, at least, were discovered. My heart was beating too rapidly. I could hear it pounding. Breathing was short and quick. My mouth was hanging open and dry. I thought I felt a tenseness in my muscles. Then, presto! My fears were gone. I was no longer afraid. The feeling of relief was like the period of calm after a tornado. I rose up hastily with the feeling of gratitude that my college training had helped me out of one difficulty, at least.

Just as I got to my feet, there was a rattle in the brush near by and the next moment out leaped a full-grown doe. She stopped within twenty feet of me. Before I had time to recover from my share of surprise, two timber wolves sprang out of the thicket,

". . .out leaped a full grown doe. . .two timber wolves sprang out of the thicket, close on her trail."



close on her trail. It is all too easy to project one's own feelings into an animal, but I never saw a more pleading look than was on that doe's face. "Can't you do something for me?" she seemed to ask. Nor could I tell her that my plight was as bad as her own. Ten minutes before, the howl that I heard coming from those rows of ivory had scared me stiff. Now they were uncomfortably close as they snarled at me. Somebody must do something to break the deadlock — move, or yell, or die, or something! The one that pulls the biggest bluff wins, I thought. So I made a sudden lurch toward the wolves, reaching out my arm as if grasping a club. With a growl they retreated into the brush, and the deer bounded off as though her feet were wings.

Out of this unusual circumstance I got the suggestion that resulted in my finding the way back to the village. Deer, when closely pursued by wolves, invariably make for the water, for a deer can out-swim a wolf. Since that doe kept on in the same direction she was traveling when I first saw her, I felt certain she was headed for the coast. That was where I wanted to go. Then like a flash, a new thought struck me: "I know the coastline well. Every stream finds its way to the coast. I'll hunt one and follow it." Why I had not hit on this idea sooner can only be attributed to stupidity.

A brief search revealed a small stream. Following this for a short distance I came to the stream on which I had seen the beaver colony. For another hour and a half I scrambled over logs and rocks and roots until, in the twilight, the clear water of the bay lay before me. Home was not far away.

But, I wondered, did the doe outstrip the wolves?

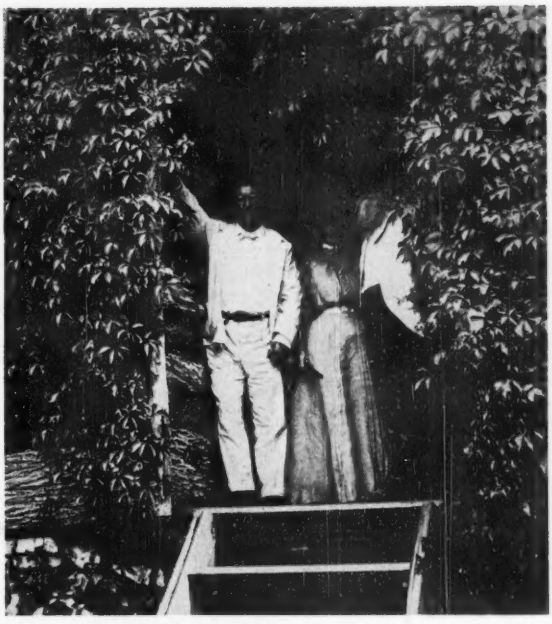
Copperhead Ridge

(Avon Conn.)
By ULRICH TROUBETZKOY

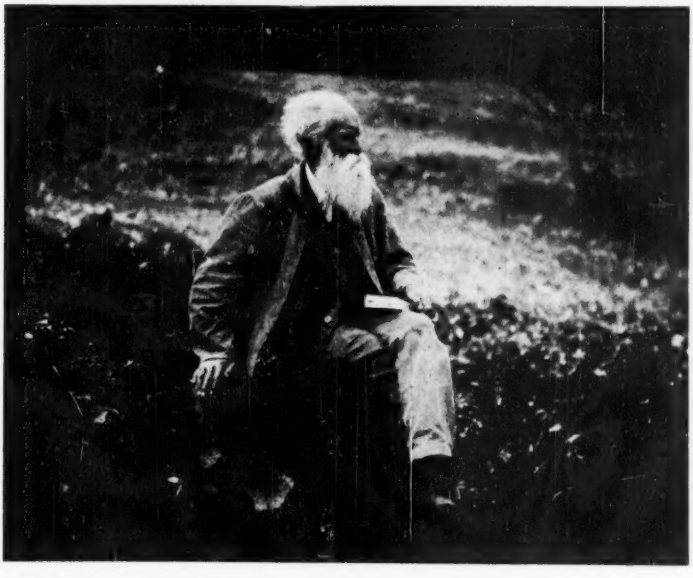
Today the mountain is all quietness —
the swan sleeps white beside the pewter lake
like one enchanted into idleness;
even the peevish jays do not awake
the drowsing woods, nor redwing blackbirds sing
on swaying reeds. The terraced earth is ploughed
and seeds surge, noiseless, at the furrowing.
In so much silence there is something loud.
like the heart's resonance inside a shell.
Stand still to see tall color in the bud —
wild apple, maple, birch — thus heeding well,
lest you should maim the yellow adder's-tongue,
secret in speckled leaves, or bruise the frail
star-petalled bloodroot, trample down the young
furred croziers of ferns, or on the pale
tremulous sepals of anemones.
For these discoveries on such a day,
more than for the flamboyance of the trees,
a connoisseur walks quietly in May.

Notes on John Burroughs

By STANLEY KIMMEL



Theodore Roosevelt and Mrs. Roosevelt with Burroughs on one of their visits to the bark-sheathed building at Slabsides, and, below, the author-naturalist poses for a contemplative profile at his home at Riverby.



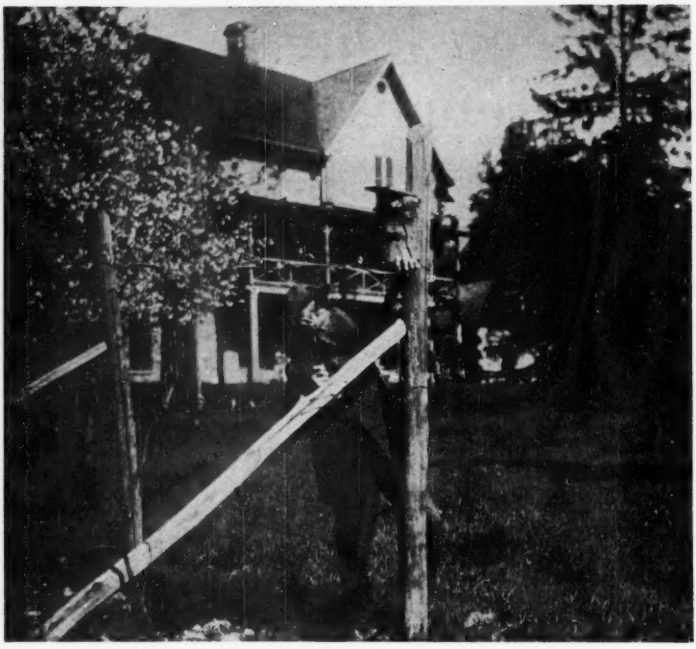
PEOPLE who knew John Burroughs intimately spoke of him as "the boy who never grew up." Born on April 3, 1837, in an old farm house near Roxbury, New York, he early learned the habits of the wildlife of which he wrote in later years. On a small piece of note paper, found among his writings after his death, he had confessed: "How can a man write what is not in his heart? If I ran after the birds to write about them, would I get very far? No. I write about them because I first loved them. I go to nature for a good time, not for literature."

In all that John Burroughs did, in all the places he lived, in all his associations, there is evidence that he went to Nature for a good time. No man enjoyed the lack of money so much as he; no man did more with what money he had. All he needed were the earth and sky, the birds that belonged to them, a river or two, and a few mountains — a big order perhaps, but one every man may enjoy if he wants it and can be content with it.

However, some of the old residents in Roxbury remembered that Burroughs in his youth, had lent Jay Gould, the American capitalist, eighty cents, "because Jay was broke and needed it." They had been classmates in the little West Settlement school, and Burroughs had been "mighty fond" of Gould's sister, Polly.

"Jay made that eighty cents grow to $80,000,000," one of the residents said, "but he didn't get as much out of life as John did bein' poor."

While in Washington, Burroughs met the poet Walt Whitman. Their close friendship resulted in Burroughs' first published book entitled, *Walt Whitman, Poet and Person.* Every Sunday morning Whitman went to Burroughs' home for breakfast. What the lovely, dark-eyed Ursula North, whom Burroughs had married, thought of these affairs was reported by their son Julian: "I remember father used to tell how provoked mother was as Walt sauntered in an hour or so after she had planned to serve breakfast," Julian said. "But it gave the two men a



John Burroughs nails up a bird house for some of his feathered visitors at Riverby.

chance to get together on the day father was home from work, so she put up with Walt's tardiness."

Following his employment by the Government, Burroughs returned to his native State and purchased some acreage bordering the west side of the Hudson River and about eighty miles north of New York City. He named the place *Riverby* and built a home of wood and stone that he selected from the surrounding country. Orchards and vineyards were planted and he continued his studies of the wildlife that was to be the subject of so many later books. For his "writing job" he constructed a small bark-sheathed cabin overlooking the river and near the main house. In this cabin his son Julian has preserved his father's books and some of his original manuscripts. There is also a cane gun that his father often carried about with him while he lived in Washington. It was used in hunting bird specimens during those early days of the budding naturalist.

"Occasionally, while roaming the woods near the Capitol," Julian said, "father would see a bird he wished to collect and bring it down with his little cane gun. If a guard rushed up to him and asked if he had heard a shot or had seen someone carrying a gun, father innocently shook his head, watched until the guard had disappeared, then pocketed the bird, went home and mounted it." Several of these stuffed birds are still in the study at *Riverby*.

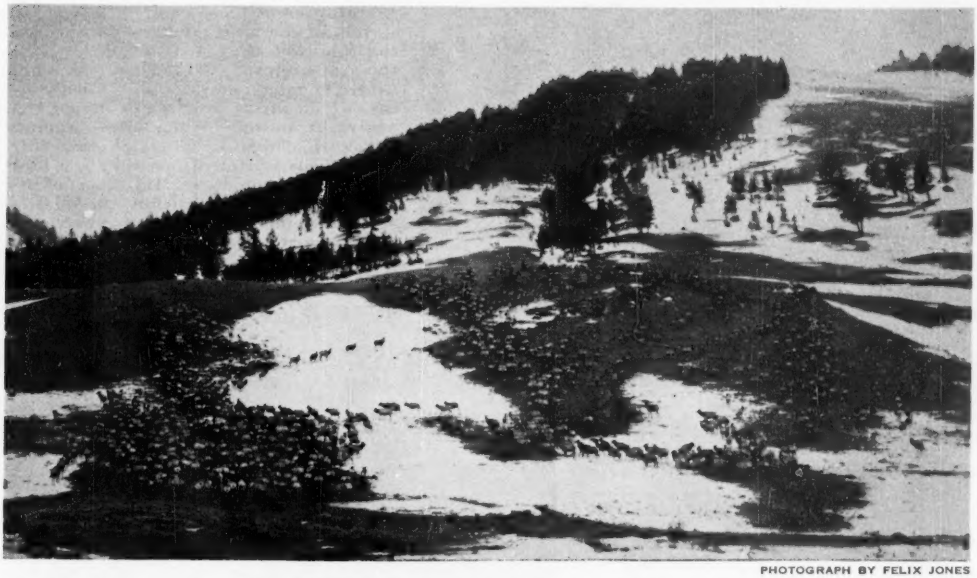
Another, and larger house, was built on this acreage, for Burroughs required more space for his growing family, work, and accumulation of books. Many tall trees cluster about the house, making it dark inside. When this was pointed out to Julian, he said: "You should have seen the place when father lived there! One day I said to him, 'Two of the books you have written are *Light of Day* and *Winter Sunshine* yet you have no sunshine in the house and very little light. Father answered, 'If light and sunshine came into the house, maybe I wouldn't write about them.' "

Burroughs built another retreat on land he bought about two miles from *Riverby*. This cabin of hemlock logs, rough-hewn and without paint, he named *Slabsides*. It is reached by a thickly wooded, winding trail. Most of the furniture in it was made by Burroughs from oddly twisted branches that he collected. Calling attention to a low footstool made from a peculiarly shaped stump, Julian said: "Father made dozens of these and gave them to his girl friends."

In time, *Slabsides* became the most famous of all Burroughs' retreats, for it was there that President Theodore Roosevelt and many other noted men and women visited him. While Burroughs was preparing one of his celebrated brigand steaks over an open fire, Roosevelt was asked if he were hungry. "No, not hungry," he exclaimed, "just greedy!"

Sadakichi Hartmann, then a young writer, was surprised to find the elderly naturalist nestled down in the wooded section rather than on the height of a surrounding hill. "A hilltop is no place to study birds," Burroughs informed him. "Birds do not build their nests nor spend much time in windy places, but where they can find protection from storms and teach their young to fly."

Toward the close of his life, Burroughs liked to recall these visits of his friends, and the journeys he took to distant places. His trip westward to see John Muir and to explore the Grand Canyon, Yellowstone Park and the Petrified Forest, to Alaska (with the Harriman expedition) where he "got a glimpse of Asia," and voyages to Europe, the Hawaiian Islands, and Central America, were great adventures for him. He enjoyed camping out with Thomas Edison, Henry Ford and Harvey Firestone. It amused him to tell of a newspaper account of one of the (Continued on page 216)



PHOTOGRAPH BY FELIX JONES

There is always a thrill in the sight of the elk in movement; a sight that seems ever to require music that will proclaim the rhapsody of our wilderness places.

Spring Comes to Jackson Hole

By GRACE V. SHARRITT

"IT'S SNOWING juncos!" I shouted. "Pink-sided juncos instead of sleet!" The world within our Wyoming ranch yard seemed an animated feathered bed of pink vests and slate-blue hoods.

"Look at them," I called, as the birds flew about, perching briefly in the pine trees or bouncing against the windowglass with soft thuds, leaving fluffs of light gray down on the pane. "Ten, thirteen, twenty, twenty one, . . . I give up!"

This was no time to make a bird count, but a moment to be held in ecstatic enjoyment, treasuring each delectable bit of color, sound, and motion to its fullest. It was a moment of infinite poignancy, evoking memories of long-ago Aprils, of far-away friends, and of springs that inevitably follow the grimmest of winters.

"Hey!" a voice teased behind me, the owner seizing the binoculars from my hand. "It's April that has you confused. You've looked at snow and ice and ground blizzards so much that you wouldn't know a pink-sided junco from a wart-nosed coyote."

Wyoming winters can be murderous, with temperatures hitting forty and fifty below, with blinding storms that obliterate sky, tree, man and beast from the horizon for days on end. And the winter had been such a one. Even when the winds had stopped their incessant moaning, howling gyrations, there were weeks when, across the plains to the mountain peaks, lay a world of unbroken white. My eyes had ached and hungered for some faint sign of color, some change in outdoor texture, some infinitesimal relief in the landscape.

But now it was April! The last week of a month that, although still squabbling with winter, had sent whirling feathers to my doorstep and wisps of tiny bird-melodies. And the snow; the deep, deep snow, which had begun falling in October, piling drifts eight feet high in places around the house, had finally disappeared after soaking the semi-arid land with vital moisture.

To be sure, there were fragments, if only to remind one that Jackson Hole is rarely without the presence of snow on her regal mountain peaks. But this only increased the joy of the dainty birds fluttering like debutantes at a tea-dance among the leafless native rose bushes, dogwoods, and choke-cherries. These shrubs I had laboriously transplanted in September to create a meeting and eating place for the birds in front of our large picture-window.

This small rectangle of effete cultivation may have seemed out of place in a primitive country. It was, however, a bird sanctuary in miniature, a sort of inner wildlife cloister within the government reserva-

A spring snowstorm covers the feeding station of the birds, and the author carries a bucket of grain and seeds to feed the gray-crowned rosy finches, which are winter boarders, and the pink-sided juncos, which arrive in April to herald the arrival of spring. When brief summer reigns, this small rectangle of effete cultivation in a primitive country is a bird sanctuary in miniature. It is a sort of inner wildlife cloister within the 25,000-acre government reservation where the author makes her home.

PHOTOGRAPHS BY ALMER P. NELSON

tion that is my home, and, as the National Elk Refuge, home also to the largest elk herd in the world.

The refuge was set aside years ago by the government and is maintained primarily for the winter care and feeding of the thousands of elk that have been encouraged to survive in a narrowing North American range. The reservation operates much as any western cattle ranch, providing hay and meadowlands for the animals from November into April, when the elk wander back into the high mountains of the Yellowstone region.

However, the 25,000-acre refuge, which lies to the southern end of the sixty-mile length of valley, is protection also to other mammals and waterfowl.

Jackson Hole is not on any particular bird-flyway, and may even be said to be off the beaten track in the intermountain area. However, this high valley of the Teton Range of the Rockies is at an altitude of 6200 feet and does boast unusual birds and mammals. Aside from the elk herd, moose, mule deer, bears, and mountain sheep are at home in this beautiful valley.

Among birds, the water ouzel, lover of foaming mountain rapids, is a year-around resident, building its mossy nest within the protection of river spray. On the fields near my home in our brief summers, long-billed curlews call their wild cries, and in the marshes phalaropes live in accord with willets, trumpeter swans and sandhill cranes. But during the long winters we have to search for birds, and there may be days on end when the only activity, aside from the ever-present ravens and magpies that haunt the herds of elk, will be the constant pounding on the window-sill of the Clark's nutcracker at his suet, and the noiseless flight of the short-eared owls hunting for mice at the ranch-yard fence.

Finally the pink-sided juncos began to arrive, first in two's and three's that picked diffidently at the seeds tossed on the porch. Later these were joined by flocks of thirty or forty companions, as on this April day, and I knew that spring was near. Hurriedly I put on warm coat and boots to join my husband, who already had the motor humming in the station wagon, and away we bounced over the deep ruts of mud to see what else might be feeling the urge of spring.

Although the wheels slithered on the clay, the car did not disturb a herd of mule deer nibbling on seemingly nothing along the curve of Swan Butte. But what nearly threw us into the ditch was the unexpected delight of a flock of ten mountain bluebirds flitting among the dun-colored animals.

As we slowly made the grade over the mangled road, we focused our binoculars upon the warm springs of Flat Creek where we feed a small flock of trumpeter swans each winter, an experiment that has been moderately successful in holding the numbers of this rare waterfowl. (*Nature Magazine*, Aug-Sept., 1949).

One pair of the trumpeters floated gracefully in the stream, billowing white against the dead, brown tules in the marsh. Muskrat houses, which had been snow-submerged, were now revealed, dotting the swamp with brown mounds. And at one of these brown mounds, a former nesting site, one pair of the swans were feeding! Deeper in the slough we observed eight *Grus canadensis*, known locally as sandhill cranes, although technically there is debate whether they are little browns or sandhills.

U.S. FOREST SERVICE PHOTOGRAPH

Against a background of the awesome grandeur of the Teton Mountains, in a setting of spectacular beauty, a simple dandelion speaks of springtime.

On we drove across the sage and rabbitbrush searching for strutting sage grouse. A western meadowlark called from a tip of sage and a sparrow hawk twitched its tail from its perch on a rocky outcrop. We crossed an area called Poverty Flat by the early homesteaders, because of the land's frugal soil and plant growth. It is across this flat that the long lines of elk travel during fall migration and return to their summer range by some of the same worn routes in spring. That day bands of bulls, with new velvety antlers and whitish spring coats, slowly walked towards the hills. Some were in single file, others with groups of cows and calves spread out on the Flat like some immense motion picture scene, with the majestic Teton Peaks as a theatrical backdrop.

There is always a thrill in this sight, no matter how often you see these animals in such great numbers. It seems ever that there should be grand and eloquent music, with crashing chords and cymbals accenting softly muted strings, proclaiming to the world the rhapsody of our wilderness places.

Before I became completely lost in meditative mood, inspired by the elk, my husband suddenly stopped the motor, seized the glasses and climbed to the top of the station wagon! He stood silent in sober contemplation.

"Moutain sheep," he finally shouted. "Six ewes and two rams on that slope near Curtis Canyon!"

I did not answer.

"Did you hear?" he asked, a little surprised that I was not, too, clamoring for a glance through the glasses. "Mountain sheep," he repeated, taking a good, deep, satisfying breath.

"Yes," I replied softly from the ground, where I was kneeling on a tiny plot of green, green grass. In fact the grass was so unbelievably green to snow-plagued eyes that I had felt it tentatively to make sure that the grass was not a mirage.

"Look!" I pointed to a golden-colored, short-stemmed flower in the grass. The flower had no fragrance, or the fragile beauty one associates with delicate spring blossoms. Yet I touched it with awe.

"That!" he laughed. "What's the matter with you? First it was snowing birds, and now you're going to pieces over a dandelion!"

"I know," I replied, grinning. "But that's how spring hits me in this country."

For to one who lives there, Jackson Hole is like no other place in the world. It takes a special frame of mind to live with its wild, mysterious beauty and its gorgeous ruggedness as everyday fare. But a dandelion, a simple little field flower, brought the awesome grandeur down to my level. I felt easier in mind and happier in spirit to know that even the most spectacular among earth's settings could find room for the humble of Nature's flowers and folk.

It may not be easy to understand — a heart, pentup by harsh winter, gushing over the sudden sight of a dozen blades of grass, a (Continued on page 216)

Desert "pavement," or mosaic, curious achievement of wind deflation and slope wash, is crossed by this old mining road to the Kofas in southern Arizona.

Wind — Desert Artisan

By JOHN LINDSEY BLACKFORD

Photographs by the Author

IN OUR desert Southwest the wind signifies much more than its Indian name, the Cloud-Pusher, for it is more than a chance bringer of rain. Here the wind is an artisan, engaged in changing and shaping the face of the land. Here the rocks themselves, many of which are ancient, consolidated dune sands, tell us that the region is an age-old theatre of wind erosion.

I recall the "blow" I bucked into far out on a southern Nevada highway. None of us had given a thought to invading the domain of the wind. Yet presently toward us, over the wildly tossing creosote, swept an evil, dirty dust cloud, towering up menacingly many times higher than the skeletal ranges ahead. Soon the sand began scurrying, then pouring sheet-like across the pavement. The dingy cloud buffeted and sucked at the car like the forced draft of a furnace. We began to watch apprehensively the rising sand-blast that struck us. It sounded as if a million tiny hammers were nicking and chipping at the laboring machine. Despite our fascination, we wondered if the tawny torrent would glaze the windshield. What might its steady rasping do to the car's new paint job? Suddenly we were made to realize that on the desert the wind seizes tools and goes violently to work as in no other part of the globe.

The wind's efforts here are conspicuous, its creations unique. Driven sands carve, undercut, and polish the walls of narrow defiles and canyons. Where weak bedrock lies exposed to permanent, dust-laden air currents, they succeed in grooving and smoothing the floors of shallow basins. Wind and rain together "lay" the *desert mosaic* that paves many gentle outwash slopes and extensive bajadas. These "pavements" are formed when wind and slope-wash carry away the fine alluvium between surface pebbles, and, in the process, settle them tightly together in a flat, stony flooring.

(Continued on page 216)

Where the desert wind turns artist — Death Valley Dunes.

Melissa, A Singing Mouse

By ROBERT SPARKS WALKER

Illustrated by Jackson Abbott

MELISSA had been singing for three months in a home on Lookout Mountain, Tennessee, before she was sent to cheer us up. I had heard of a singing mouse now and then, but doubted the existence of such animals with noticeable musical talents.

Addie, our colored maid and mother of nine children, had been brought up in the country on a farm, and claimed to know all about rats and mice. She became deeply concerned over the report of there being such an animal as a four-legged musical celebrity. We could see from the expression on her face that she was gravely worried about the imminent arrival of a furry Crosby.

"A singin' mouse? A singin' rat? I'ze never heerd of sich a critter in my born days. Dat's a sign! Dat's a sign pure an' simple!" she declared portentously. The fact that a mouse had been found singing worried her more and more, until, in the agony of her soul, she burst forth.

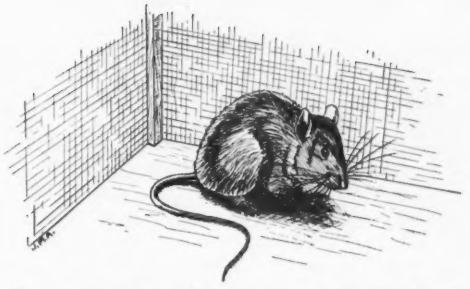
"A singin' mouse! A singin' rat! Look heah folks, when de rats gits ter singin' yo' sho' had better prepare to meet yo' God!" she exclaimed, prophetically.

Melissa, the singing mouse came promptly. She was occupying a two-room-apartment mouse cage. The workings of the inside trap-door she had fully studied out, and knew precisely how to manipulate it, so that she traveled with ease from the upper to the lower room.

Melissa looked to me like any other common house mouse, although somewhat tawny in color. She spent much time squatted in one corner of her upper room, and she seemed to be dressed in a fur "Mother-Hubbard dress."

The cage was placed on the writing table in my combined workshop and bedroom. I was not going to risk missing any vocal solos. Melissa had not been in my room long before she produced a noise that sounded like a miniature sewing machine in full motion. Peeping in on her privacy, I could see the muscles in her cheeks, and those behind her front shoulders, in rapid vibration.

For one full week, however, Melissa had given me nothing but the frequent noise of a tiny sewing machine. I decided that, if this was the extent of her musical accomplishments, the time had come to give her her freedom. The evening of that decision, however, at eight o'clock, Madam Melissa really began singing. It was a mixed trill and a warble. While quite low, I thought it was more musical than the songs of yellow warblers and some of the other warbling birds. Nevertheless, it was loud enough to have been recorded with a microphone. Twice during the night I was awakened by such solos.



". . .she spent much of her time squatted in one corner of her upper room."

The following morning, before I left home for the day, the mouse's cage was placed on the back porch; on my return, taken back to my bedroom. A hard, thick cardboard tube, a foot long, had previously been placed in Melissa's cage to afford her a place to hide at any time, just as a frightened rabbit seeks a hollow log. She had been sleeping inside this tube, but during this night she sang often, meanwhile working noisily at tearing the tube into shreds. Indeed, she created such a disturbance that I was awakened a half-dozen times. An hour after daylight, when my little granddaughter-naturalist came down to take a "good morning" peep at a creature she greatly admired, she screamed in ecstasy. She urged me to come quickly; Melissa had a litter of eight babies! "No wonder she kept you wide-awake during the night; she was busy cutting out and making baby clothes and blankets!" I was told.

". . .she worked noisily, tearing the tube to shreds."

Inside the cage was a pile of eight pink, naked, baby mice, each about the size of a quinine capsule. The mother sat over in the corner, unexcited, and I noticed the "Mother-Hubbard dress" had disappeared. Near her was a pile of gnawed paper, which almost touched the ceiling of the cage. In another hour she had carried the newborn urchins into the pile of paper, and she and her offspring remained hidden for many

days. During the rest of the morning, as I hammered away at my typewriter, not more than eight feet away from my desk, the mother sang lullabies to her children. Whether this was a coincidence or accidental, I would not dare make a guess.

At intervals throughout the day she was heard singing. She kept the children well concealed for almost ten days, after which I was flabbergasted when I saw eight strapping, furry sons and daughters, all nursing at the same time. There was always one mouse that chose to lie flat on its back with its four feet sticking upwards while it dined. Now, I thought, I would surely have enough singers to make a choir, or at least a fine quartet, if the youngsters inherited their mother's musical talents. During the remainder of Melissa's sojourn with me, she seemed to be happier and more inclined to sing than she had before her children came.

Dr. Lee. R. Dice of the University of Michigan, who has been specializing in the study of singing and dancing mice, heard of this family, and expressed a desire to have them sent to him. Before the day of Melissa's departure came, two of her children escaped, and one of them slipped into my bed. When I awoke, he was sitting on my bare arm. When the time came for Melissa and her remaining six handsome children to leave my roof for her new home in Ann Arbor, she left my home singing a lullaby.

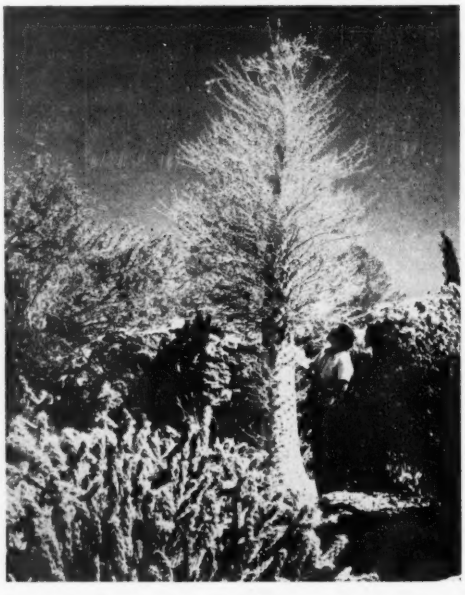
Three months later, the mouse that stayed with me sang so loudly during the night that I was awakened twice. He sang with animation and twice as loud as his mother, and the trilling warble was more musical that that of his talented parent.

When I wrote Dr. Dice about this, he reported that Melissa had acquitted herself as a very good singer, and that she produces a series of chirps and trills that are birdlike in quality and very pleasing. He says that she is stimulated to song when she hears other music, but performs spontaneously during the night. Dr. Dice adds that, thus far, one of her six children has been heard to sing, but that some of them go through motions that lead him to believe that they produce sounds too high in pitch for the human ear to hear.

★

Unbelievable Boojum

By NELL MURBARGER



WERE the Boojum tree native to the mountains of Mars, its bizarre appearance might be halfway plausible, but for such a botanical freak to spring from our own North American soil is stretching the limits of credulity a bit too far.

Known variously as Boogum, Boojum, or Cirio, and to the botanist as *Idria columnaris*, this strange fellow is a native of northwestern Mexico, where it contributes its sparse shade to the hot, arid plateaus of Baja California and Sonora.

During its first years of life, the Boojum nestles in the rocks, a small, prickly ball, nearly as wide as high. As the embryo tree develops — with a slowness commonly attributed only to the mills of the gods — its base becomes swollen, its crown eventually acquires a point, and a plume of thin, lateral branches comes to envelop the upper portion of its trunk. At this stage of life, the tree's appearance is not unlike that of a gigantic, upside-down carrot. To bear out the simile, the inverted carrot would need to be exceedingly rooty, white or yellowish-gray in color, with every inch of its body encased in the most vicious of thorns.

Maturity may see the Boojum as much as fifty feet in height, the older specimens developing grotesque forms in which trunks and heavier branches twist and turn and dip like professional contortionists.

With death the tree loses its fleshy outer skin, its thorns, and pulpy interior, leaving only a hard, skeletal tube perforated by thousands of rounded holes. Wild bees quickly lay claim to the empty trunks, and many natives of the Boojum country gain a large portion of their income by robbing the strange hives, a single one of which may contain as much as one hundred pounds of wild honey.

Closest relative of the Boojum in the United States is the ocotillo or candlewood of our southwestern deserts — a plant that is completely different in appearance.

While whip-poor-wills usually perch lengthwise on a limb to avoid observation, when excited, or attempting to attract attention away from the nest or young, they perch crosswise. The large, "shoe-button" eyes of this female are typical of nocturnal birds and mammals. Note the small size of the feet in proportion to the body. Below is the whip-poor-will cradle on the forest floor, with two eggs, splotched in such a way that they are difficult to see.

Whip-poor-wills

By CHARLES and ELIZABETH SCHWARTZ

Photographs by the Authors

AS THE sun-splotched glades of the hardwood forest are overtaken by the deep gloom of twilight, one of the first voices to be heard in this world of darkness is that of the whip-poor-will. Although the song of this woods dweller is known and recognized by many, few people have ever seen its maker. This is partly because whip-poor-wills are abroad only at night, and partly because their protective coloration matches the dead leaves and dead wood of the forest floor, where they sleep all day.

The whip-poor-will belongs to that ill-named family of birds known as Goatsuckers. This popular name stems from a European belief that these birds secured milk from goats. Perhaps this false tale arose from observing some of these birds flying about goats at twilight, at which time they were feeding on insects attracted to the goats.

The whip-poor-will has soft, owl-like plumage, which aids in its noiseless flight. An enormous mouth is bordered above by long, stiff bristles, which act as a net in catching insects, upon which the bird feeds exclusively.

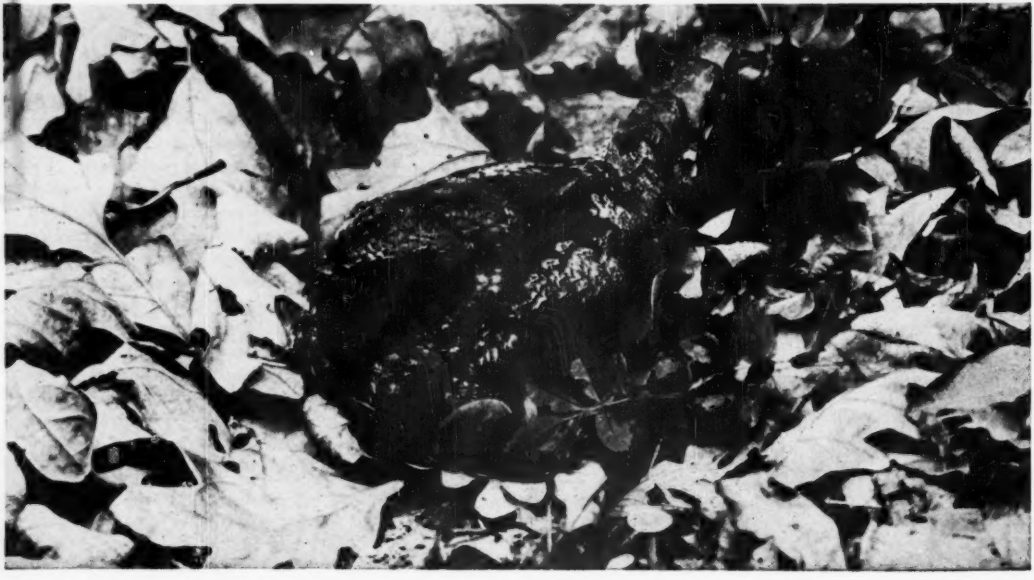
From its winter home bordering the gulf of Mexico, whip-poor-wills migrate to their breeding grounds in the northern half of the United States and southern Canada, east of the Rocky Mountains. This flight usually is in April, and it coincides with the presence of newly-hatched insects in these northern areas. Generally the birds frequent woodlands that have not been heavily grazed or subjected to burning. It is striking how their distribution within a general region conforms to this land-use pattern.

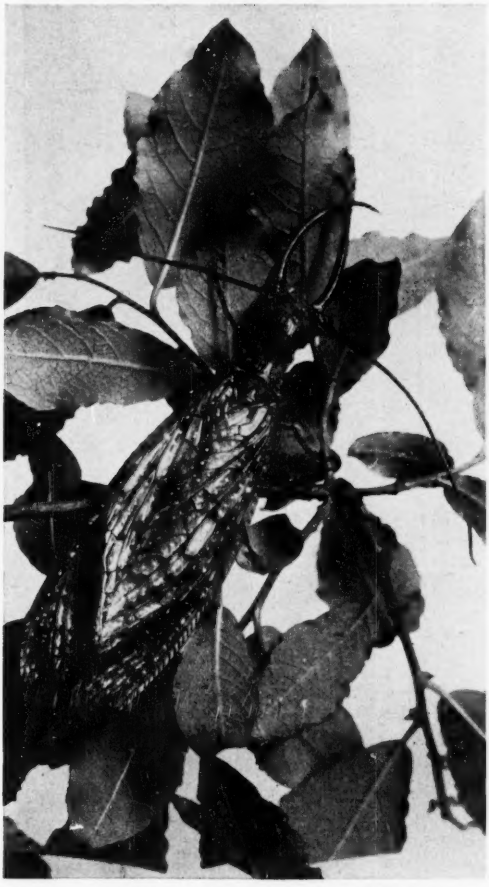
It takes sharp eyes to discover a whip-poor-will on its nest. Above is an adult and a young bird, both protectively colored in their woodland nest site.

No attempt at nest building is made; the two eggs, cream with lavender splotches, are merely laid on the forest floor. Although seemingly little protected, their blotched coloration, the soft colors of the fallen leaves, and the flickering light of the woodland all tend to harmonize into a protective shield. The incubation period has not been definitely established, but is reported to be between twenty and twenty-four days. The young are as well camouflaged as the adults, their lighter buff coloration being practically indiscernible from the oak leaves.

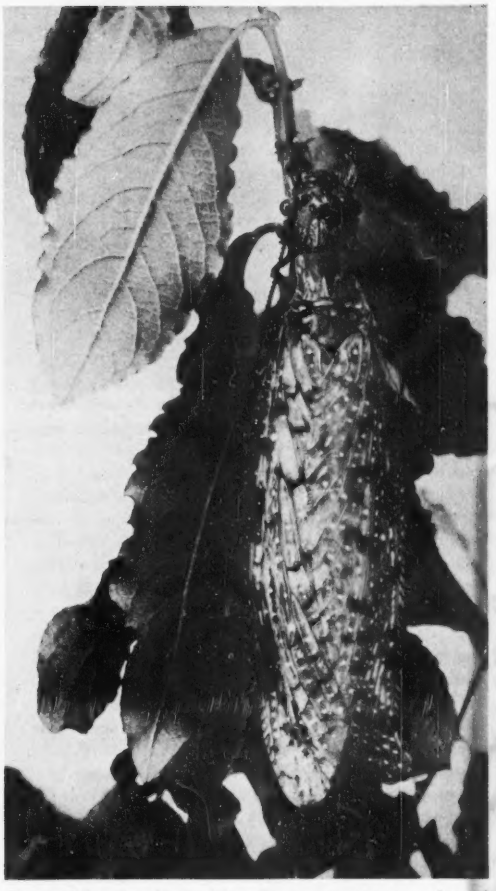
The song of the whip-poor-will, from which the bird gets its name, is heard most often from dusk until about 9:30 p.m., and, again, from 2 a.m. until dawn. This bird has a remarkable reputation for its incessant calling; from fifty to one hundred repetitions are not uncommon, and several times these numbers have been reported.

Like a dead, lichen-covered branch in a litter of dead oak leaves, a male whip-poor-will incubates the eggs. This duty is rarely shared by the male, the female usually assuming full responsibility. The bird's eyes are half closed, perhaps as protection.





The male dobson fly is equipped with most efficient-appearing mandibles, but these are not used for defense but only in mating with a lady dobson.



The mandibles of the female dobson fly are not as imposing as those of the male but they are powerful and are capable of inflicting a fairly severe pinch.

Dobson Fly-Insect of Many Aliases

By L. W. BROWNELL

Photographs by the Author

THE dobson fly, little known to the average person because of the fact that it is entirely a night flier, is probably one of the most striking and curious of all our native insects. The mature insect is large, having a wing spread of from four to five inches, but its actual body is much smaller, being little more than an inch and one-half in length. Despite this considerable expanse of wings, which would seem to be able easily to carry the relatively light body, this insect is not a strong flier and cannot sustain a prolonged flight. It is frequently to be seen flying around a street light, especially if the light is near a water-course, and will soon flutter to the ground. The female is equipped with small but powerful biting mandibles, with which she is capable of inflicting a fairly severe pinch. The mandibles of the male, however, are much larger, being about an inch in length and curved and crossed at the tips. These give the insect a rather ferocious appearance, but this is entirely fictitious for its efficient-looking biting equipment is never used as a means of defense, as is that of the female, but apparently only to hold the female during the mating period.

The dobson fly begins life as a rather unlovely aquatic

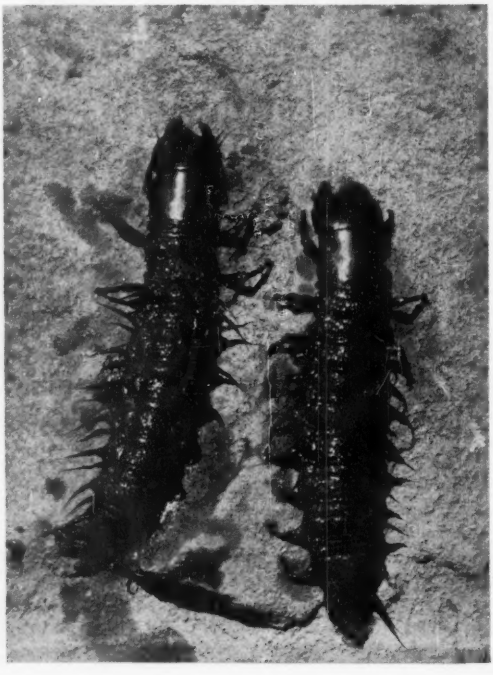
larva that is well known to anglers, who use this stage of the insect extensively as fish bait, knowing the larvae under the names "hellgrammites," "crawlers," "dobsons," and "bass-bait." These, as well as the mature insect, are known by many other popular aliases. Besides the four names already mentioned, these flies, in their various stages of life, have been called conniption bugs, amlies, clippers, water grampusses, goggle-goys, bogarts, crocks, hell-divers, flip-flaps, alligators, Ho-Jacks, snake-doctors, and dragons.

The larvae of the dobson fly are found in fairly rapidly running streams, where they hide under stones. When full grown they measure from two and one-half to three inches in length. They are dark grayish-brown in color and possessed of rather large, strong mandibles. They are fiercely predatory, feeding entirely upon other aquatic insects. They are provided, at the anal end of their bodies, with two strong tubercles each having two curved claws with which they can hold firmly, to any object even in the strongest currents. They remain in the larval stage for a little less than three years.

In late April or May the larvae come out of the water and crawl about on the ground, looking for a suitable place for pupation. They travel only at night, hiding during the day under logs, stones, or any other suitable objects lying on the ground. They crawl with considerable energy, but never far from the water, and have been known to climb trees. Finally each larvae finds a proper pupating spot. This is always under a log, stone, piece of old board or bark, or anything else that is lying flat on the ground and under which it can crawl. It hollows out, beneath the chosen site, a spot large enough in which to coil and transform to the pupal stage. The pupa is light-yellow in color, and in shape somewhat like the larva. In about a month the transformation to the winged adult occurs.

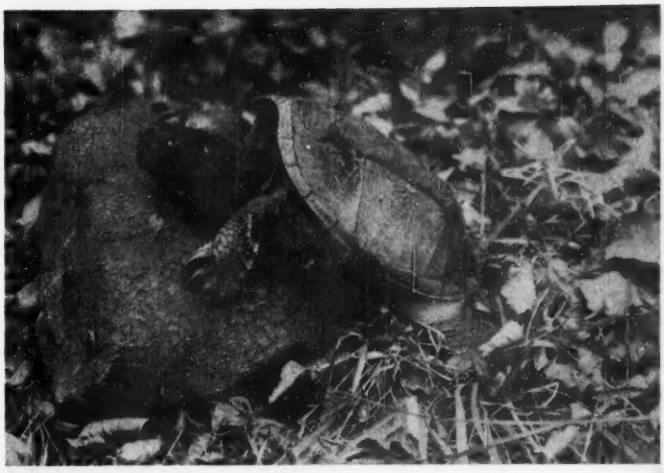
The body of the full-grown dobson fly is reddish, but its wings are light-brown. Its existence as an adult is short, lasting only a few days, during which it is not known to eat. Mating occurs shortly after leaving the pupa. The eggs are laid in white, chalky masses on leaves of trees and shrubs, rocks, bridge piers, or similar places that meet one main requirement. This site must always be where the young larvae, when they hatch, can drop directly into the water.

The pupa of the dobson fly looks somewhat like the larva, below, and can be found under logs, rocks and other objects that lie flat on the ground. The larvae are favorites of fishermen and, besides dobson flies, are known by a wide variety of local, popular names, including such oddities as goggle-goys, flip-flaps and conniption bugs.

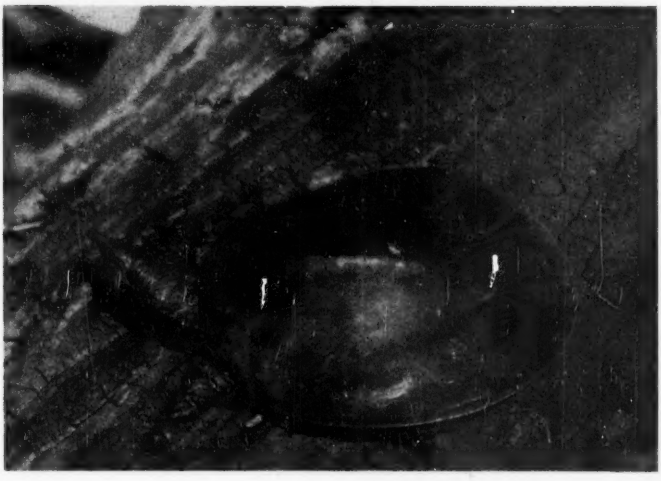


Shell backs

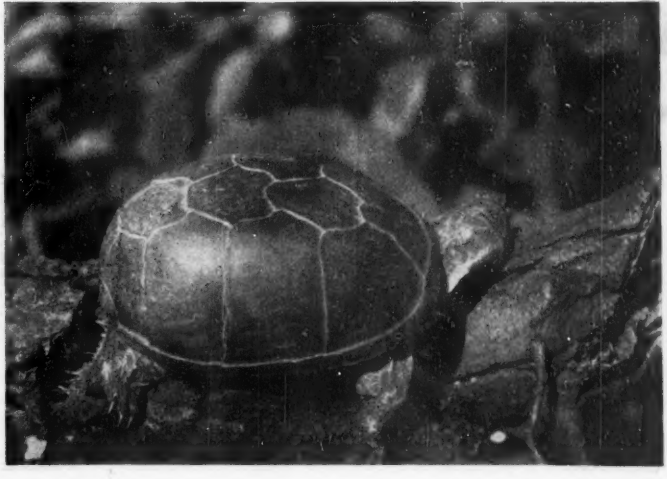
Photographs by L. W. Brownell



Aside from the salt water turtles, the alligator snapping turtles (not shown here) grow to be the largest North American species. Probably the valley of the Mississippi harbors the bulk of the snapper population, as the species ascends most of its tributaries to its source. From fifteen to thirty pounds is usual. The snapper's eggs are about an inch in diameter, with a tough, white, leathery shell. They can be bounced on a hard surface without breaking. These turtles are found throughout the eastern half of the United States, from southeastern Canada to eastern Mexico and into Central America, in watery habitat where aquatic plants are available. The snapper will defend itself with a vicious strike, and hang on to what it has grasped in its strong jaws. Once warmed up to battle, it is aggressive. It hibernates in winter in mud, or in holes in the banks of streams.



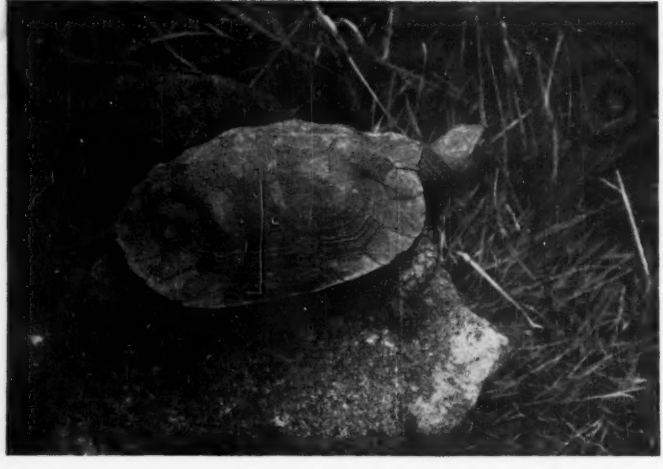
Soft-shelled turtles belong to the genus *Trionyx* and their popular name describes the leathery and flexible shell that distinguishes them from their hard-shelled relatives. Also they have snouts that are long and soft. Their shell, or carapace, looks like a pancake. Resembling the adults, the young have more distinctive coloration and it is easier to distinguish the species from young specimens than from adults. The spineless soft-shelled turtle, *T. muticus*, is the smallest of the American species, the females being larger than the males. This turtle is speedy on land and in the water, and is said to be able to outrun a man. Defending itself, it will dart its head forward after the fashion of an angry snake. Its jaws are sharp-edged and it can bite effectively.



The common mud turtle is known to science as *Kinosternon subrubrum subrubrum*. It is an eastern and southeastern species, found from Long Island and New Jersey south to Alabama and Georgia. It usually prefers ponds, but may turn up in other watery areas, including swamps and marshes, although it is not as aquatic as some of the other turtles. There are various chapters in this turtle's life that are not yet definitely known. Some claim that it will hiss and bite, and others that it cannot be made to bite. Also reproductive habits are a matter of debate. Although insects, fishes and worms are claimed to form its diet, not too many data have been discovered as to its menu. Fishermen claim that it takes their bait frequently.

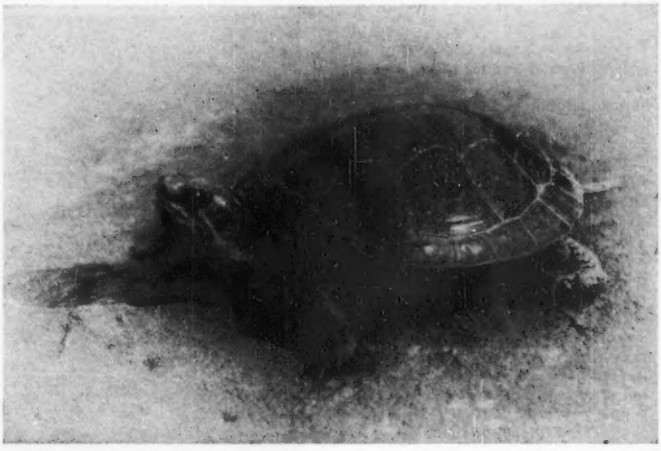
The common musk turtle can be identified by two yellow stripes that run along either side of its head. Its carapace is neither streaked nor spotted, is brown or a dull olive color, and there is only the suggestion of a keel along its shell. Its scientific name is *Sternotherus odoratus*. It is found widely over southeastern Canada and eastern United States, and is entirely aquatic, liking the muddy bottom of watery places of all sorts. The popular name of this turtle comes from the fact that, apparently as a means of defense on land, it exudes a yellowish fluid from glands situated along the border of its carapace. This fluid has a strong musky odor. The musk turtle will defend itself, but its bite is not either strong or dangerous to man.

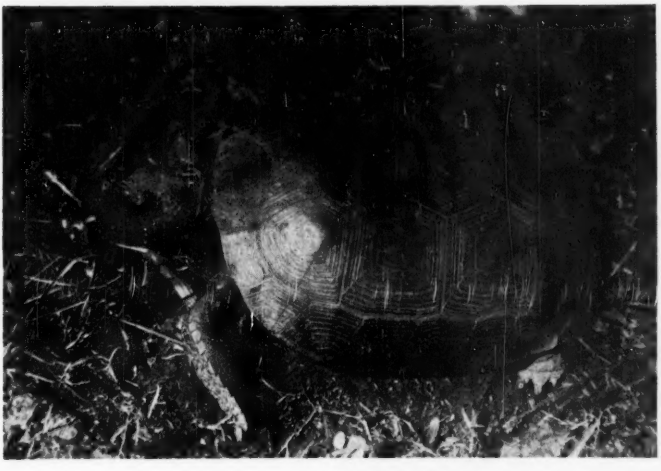
Wearing a black carapace that is marked with many small, round spots that are yellow or orange in color, the spotted turtle, *Clemmys guttata*, is easy to identify. It is a species of the northeastern and eastern United States, and is found in southern Ontario. For its habitat it selects water areas where the water is sluggish or quiet, and is often found in wet woods and even in areas that become rather dry. This turtle is extremely wary and will try to get away rapidly when disturbed. Failing to escape, it will retire into its shell and stay there without any attempt to strike or show any other belligerent reactions. The spotted turtle has a diet made up largely of insects. It has a nice disposition in captivity and makes an interesting pet, being extremely hardy.



The wood turtle is a relative of the spotted turtle and of the same genus, being known as *Clemmys inscupta*. It is also known as the sculptured turtle because of the markings on its carapace. Its shell is made up of concentrically marked pyramids. This turtle is found from the southernmost Canadian region in the east, south to the general line of the Potomac River, extending as far west as parts of southern Wisconsin. The wood turtle divides its time between a land and water existence, summering and breeding on land and wintering in the water, mainly in streams. It also is an accomplished climber and no shallow container will hold it long. This turtle is largely a vegetable-eater but may vary his diet with insects and other items, varying with the habitat currently occupied. It makes an excellent pet if given a suitable cage of some size, and is quickly tamed, although shy when first captured.

There are several species of painted turtles of the genus *Chrysemys*, and they are generally similar in habits and habitats. The eastern painted turtle is found along the Atlantic coastal plain from Long Island to northern Florida. It is often found in tidal waters that are brackish. It may grow to be as long as seven inches along its carapace, although generally between five and six inches. The habitats of the eastern painted turtle and the central painted turtle overlap to a large extent, and one must know turtles well to be able to distinguish between the species, and several subspecies. For further details about the painted turtles and other turtles, students of these interesting animals should consult the splendid book, *Turtles of the United States and Canada*, by Clifford H. Pope.

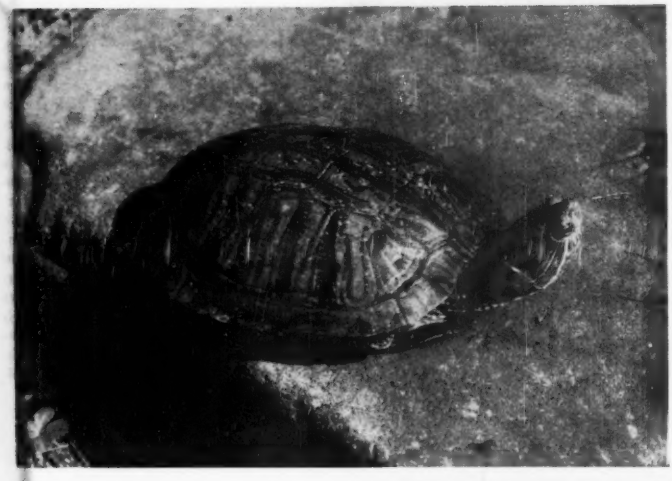




The gopher tortoise is known to science as *Gopherus polyphemus*, and is discussed at length in *Nature Magazine* for October, 1949. This tortoise may grow to weigh as much as ten pounds and reach a length along its c rapace of one foot. It is a distinctly southern species occurring from southwestern South Carolina to central Florida and along the Gulf coast into the southeastern corner of Texas. It is found on high grounds and in pine and oak woods, preferring a sandy soil and open woods. The gopher tortoise is shy and non-combative, contenting itself with a hiss when in danger, and then usually when it has retreated into its burrow. These animals may congregate in colonies numbering as many as twenty burrows but is becoming scarce through persecution. Its burrows are often taken over by other animals. This tortoise is apparently exclusively herbivorous.

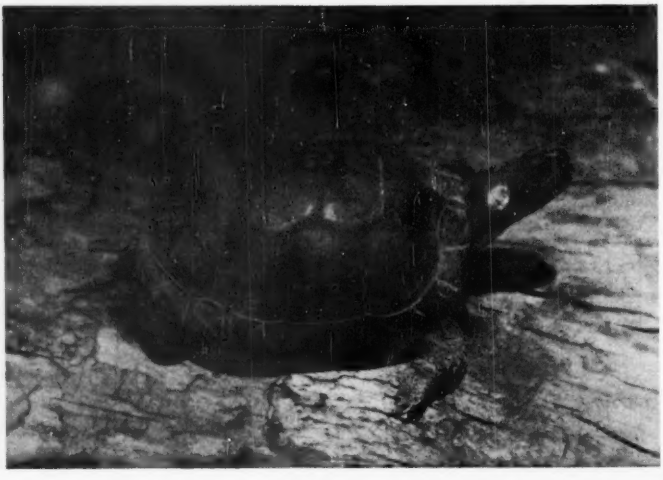
The common box turtle, *Terrapene carolina carolina*, is familiar to many. Its dome-shaped carapace varies widely in pattern and color, and may be striped, blotched or spotted, with background colors of various browns and blacks. It is a long-lived species and much of the information as to its length of life has been provided by the practice of carving initials and the date on the shells of this tortoise. Some such carvings indicate an age of well over a century. It is found in the East from northern Florida to southern New England. Because of its daytime habits it is more often seen than most other species. When surprised, it usually withdraws into its shell, sometimes with a hiss. It has a good disposition, peaceable with others of its kind, and makes an interesting pet if given proper care.

The common map turtle, *Graptemys geographica*, gets its name from the pattern on its carapace, which has a network of greenish-yellow lines that are fairly conspicuous. It ranges mainly west of the Alleghenies, its range overlapping, in part, that of the related Mississippi map turtle. It is completely aquatic and seems to prefer the larger bodies of water. It is a strong swimmer and rarely deserts its water habitat except to lay its eggs. It gets about slowly on land, and when it is captured relies mainly on withdrawal into its shell and a hiss. It may be induced to bite, but it is by nature both a shy and inoffensive creature. It often may be seen basking in the sun on some log, ledge or other spot near the water, and usually with others of its species. Its jaws are powerful and adapted to a diet that includes many mollusks. Crayfish and some insects are also eaten. In captivity this turtle continues to be shy and is fed with difficulty.



Troost's turtle is one of the most handsome, is related to the painted turtles and is called by science, *Pseudemys scripta troostii*. Along the side of its head are stripes, three to seven in number, extending back from its eye. The uppermost line has an ovate blood-red expansion. Its carapace is flatter than with most turtles, lacks a keel and is smooth. It is a middle-western form ranging to the south and into the southeast and southwest. It lives in a variety of aquatic habitats but prefers quiet and muddy water with plant growth on the bottom. It depends largely on its shell for protection. These turtles in considerable numbers are often seen sunning themselves together on logs. This is one of the species fated to be gathered for sale by pet stores after having been "adorned" by initials and other painted motifs, which dooms thousands of these innocent creatures to a lingering death.

Muhlenberg's turtle can be recognized by an orange blotch that is conspicuous on each temple of its head. It is called *Clemmys muhlenbergii* and is distinctly a northeastern species. It is to be found in or near swamps and sphagnum bogs and is dependent on the type of plant association found in such areas. It is sometimes found associated with the spotted turtle, and it manages well on land despite its aquatic preferences. Both berries and insects have been proved to contribute to its diet. In captivity, where it does well, it will also take earthworms and mealworms, as well as such items as lettuce and berries. If kept in aquarium it should be given an area on which it can go ashore when it chooses. It is not a common species.



The "Noisy Minority"

"Hoover Dam Bane to Wilderness Lovers?" is the questioning title over a recent editorial in the *Salt Lake Tribune*. The editorial writer goes on to say:

"More than 22,500 persons visited the Hoover dam in Nevada last month, setting a new record for the guided tour through the gigantic project on the Colorado River.

"The bureau of reclamation reports that 3,653,023 persons have visited the dam since it was opened to the public Jan. 1, 1937.

"There is no question about it, the Hoover dam and Lake Mead it created are popular and unique tourist attractions. The hydroelectric plant at the dam made possible vast industrialization of the Los Angeles area, contributing enormously to war and defense efforts.

"However, a group of intrepid and individualistic nature lovers no doubt prefer that Hoover dam had never been built to mar the 'natural wild beauty' of the Colorado river canyon in the area. They would rather limit the pleasure of visiting the area to a few hardy souls who despise concrete and roads. Fortunately, these blindly selfish opponents of progress, these wilderness worshippers, remain a puny, albeit noisy, minority."

Let us first answer the question indicated in the title. Neither Hoover Dam nor Lake Mead are any "bane" to those opposed to the invasion of Dinosaur National Monument through construction of the Echo Park and Split Mountain dams in that reservation. As a matter of etymology, "bane" means to murder, usually with poison, and apparently its use in connection with this editorial comment is appropriate only insofar as the object of the comment is to poison the public mind against those who believe in the defense of National Park Service areas. Historically, the puny but noisy wilderness lovers raised no objection to Hoover Dam, or the development of the Lake Mead Recreational Area. Its construction had no affect on any national park or monument. Nor have the individualistic nature lovers opposed the great majority of the power and irrigation dams constructed during the recent years of extensive dam building.

Now and then, however, the dam builders have cast envious eyes on the water resources of national parks, or the few wilderness areas that, as a people, we still own collectively. When these proposals have been made, then the "noisy minority," is heard from, a minority which happens to believe there are a few areas that are of such outstanding beauty, or so typical of primitive America, that they should be preserved intact for these values. If this is selfishness, then those who preserved Mount Vernon as a symbol of George Washington and an inspiration to generations of Americans were selfish. It seems to us, in fact, the height of selfishness for a community or group of communities to regard its interests as paramount in relation to a resource that belongs to all of the American people.

It is a familiar technique to picture anyone who espouses a viewpoint compounded of idealism and inspiration as a la-de-da Nature lover, or wilderness worshipper, or whatever combination of adjective and noun seems to suit the occasion. It is as familiar as it is inaccurate to find that such individuals are sweepingly described as despising "concrete and roads." It is familiar to find such individuals accused of opposing something that they never opposed, as in the case of this citation of Hoover Dam.

No one fails to recognize the desperate need for water in many parts of the arid West. Nor can one quarrel with the desire of western communities to progress industrially by virtue of the availability of power developed in the vicinity. Using the flowing waters of that part of the country to the fullest is essential to survival.

It is, however, the contention of the "blindly selfish opponents of progress" that such use of precious water should not be at the expense of a notable scenic area, already set aside for posterity, when alternate sites for dams exist. Such sites *do* exist with respect to the waters that would be harnessed by the proposed Dinosaur National Monument dams. Such sites should be used.

The lyrics that the proponents of the Echo Park and Split Mountain dams are now singing are set to the tune of the "wonderful recreation area" that would be created by the dams. This is, of course, the reason for dragging in Lake Mead, which has been successfully developed recreationally. Such possibilities in any man-made development of this sort should be fully realized, but there is no justification for the irreparable damage that would be done to a Nature-made wonder such as the splendid canyons of Dinosaur National Monument; certainly not when other choices for dam sites are available.

Seeking another avenue of attack upon the integrity of National Parks and Monuments, some western Congressmen are urging the invasion of these areas on the off chance that uranium ore may be found within them. This is all a part of the concerted effort to break through the barriers of law and public sentiment that surround the few and proportionately small areas that have been preserved in National Park status. Loss of such areas is too high a price to pay for satisfaction of local selfishness, chamber of commerce prestige, and political ambition. The "noisy minority" will continue to be noisy — not alone for present-day Americans, but for Americans of tomorrow and many tomorrows.

India's Conservationist Emperor

By ALEXANDER F. SKUTCH

Photographs by Smithsonian Institution, from "Early Indian Sculpture" by Ludwig Bachhofer.

Courtesy Harcourt, Brace and Company

Lion carvings on the capital of one of the columns on which the Indian Emperor Asoka had carved edicts, some of which stand among the earliest conservation rulings.

THE READER of history travels, for the most part, through a dreary, desolate land, watered by blood more often than by gentle rains from heaven. Only here and there in the midst of vast moral deserts does the traveler thirsting for spiritual refreshment come upon a green oasis or a fertile valley, where fancy loves to linger. One of these peaceful oases amidst history's arid sands is provided by the reign of Asoka Maurya, who ruled over most of India in the third century before Christ.

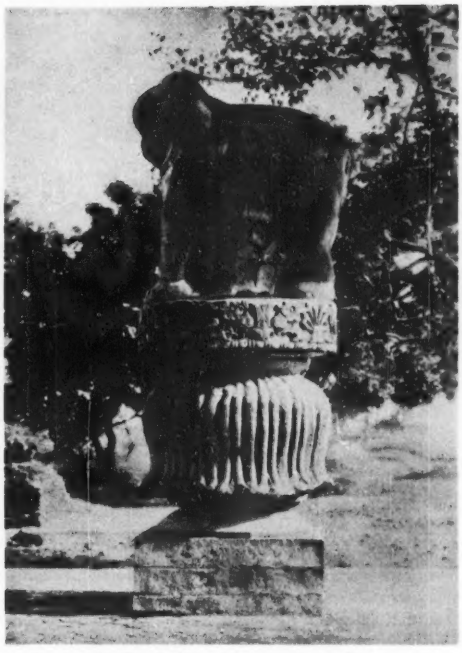
Asoka was the third sovereign of the Maurya dynasty, whose name was taken from the peacocks (mors) that dwell in the Indian forests. His ancestors appear to have been petty chieftans of a tribe established under the shadow of the mighty snow-peaks of the Himalayas. When Asoka's great-grandfather, head of the Maurya clan, was slain in battle, his wife Mura fled to her parents, who lived disguised as peacock-tamers along the banks of the Ganges. Here her child was born; but seeing for her infant boy no prospect happier than an exile's hard life, Mura carried him back to his father's hills amidst the snow-peaks. All garlanded with flowers like an offering to the gods, the babe was abandoned in a disused cattle trough. But the little waif happened to be found by shepherds, who called him Chandra after the moon, and with whom he grew up among the rhododendron-clad hills.

Later, inspired apparently by the astute Chanakya, who afterward became his chief minister and wrote a book on the government of empires, the youth fought his way back to power. Eventually he seized the throne of Magadha in the Ganges valley, then the premier state of India, and, as Chandragupta, became India's first historic emperor. Thus he was in a position to confront the Greeks, whom, in 327 B.C., Alexander of Macedonia had led into the valley of the Indus. So successful was Chandragupta as a warrior, so terrible were his great batallions of fighters mounted upon elephants, that he not only drove Alexander's successors beyond the confines of India proper, but, through a treaty with Seleukos Nikator, he obtained possession of much of the lands that are today included in Afghanistan, Baluchistan, and Makran. He was apparently a harsh, despotic ruler; and it has been said that he freed the Indians of the Macedonians only to subject them to a less tolerable domestic tyranny.

Following an ancient Indian custom, Chandragupta, after ruling 24 years, relinquished the throne to his son Bindusara, and retired to pass his old age in religious meditation. Of Bindusara's reign, which lasted for about 28 years, history tells us little. In about 273 B.C. he was succeeded by his more illustrious son, Asoka-vardhana, who was then about thirty years of age, and had already enjoyed considerable administrative experience as viceroy, first of Taxila on the northwestern frontier, and later of Ujjain. After ruling about twelve years, Asoka undertook to round out his possessions by the conquest of Kalinga, a region lying along the western side of the Bay of Bengal. When, after a bloody war, he subdued this territory, his dominions included all the Deccan except the southern third, the vallĕys of the Ganges and the Indus, and the extensive areas in Afghanistan and Baluchistan, which had been ceded by Seleukos Nikator to his grandfather. Thus on the east and south the boundaries of his realm fell somewhat short of those of the recent British Empire of India, but they far exceeded them on the northwest; and he ruled a vaster kingdom.

In his youth, Asoka appears to have been much like any other raja of the period, living in luxury and taking

Another lion motif on a capital crown. Asoka's edicts were carved on great columns of polished limestone.



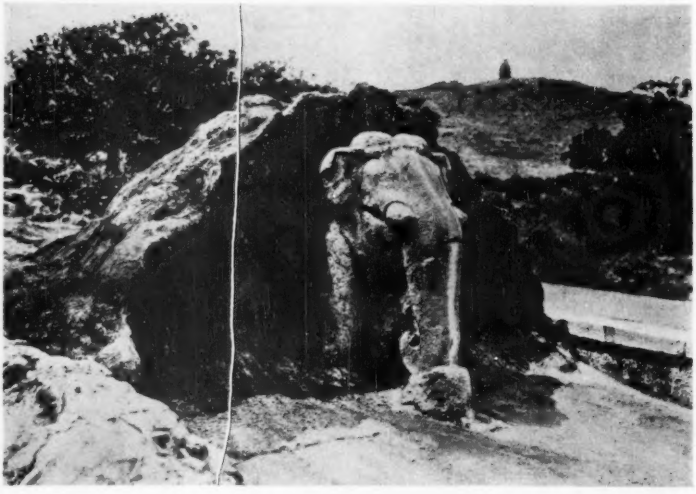
A plump elephant formed the motif that crowned the capital of another of the many Asoka edict columns.

delight in the chase. But during or directly after the conquest of Kalinga, he responded to the influence of Buddha's teachings. It is difficult to trace, through the mists of so many centuries, the stages in his spiritual awakening and growth; but by his own admission his experiences during the bloody conflict brought about a complete change in moral values and opened his heart to the benevolent doctrines of Gautama Buddha, who had lived and taught in Magadha two or three centuries earlier. At the conclusion of the Kalinga war, the Emperor became a Buddhist lay disciple, and after a novitiate of about two and a half years entered the Buddhist Order as a monk, although he continued with great energy and efficiency to administer the affairs of his vast domains. Such a combination of monkish devotion with regal duties is by no means unique in the annals of ancient India and China.

India is notoriously poor in historical documents. Her writers deemed it of more importance to preserve their thoughts on philosophic and religious subjects than to record the endless quarrels that form so large a share of the history of Europe. During the Maurya dynasty, there was an exchange of envoys between the Indian monarchs and the Hellenic rulers, who had divided the territories subjugated by Alexander the Great; and fortunately some of these Greek visitors to India left accounts of what they saw and did. Centuries later, Buddhist pilgrims from China, visiting the holy places of their religion in India, collected and recorded the still extant traditions of the great Buddhist ruler. And naturally many legends, of doubtful historic value, grew up around the memory of so important a figure. But the chief source of our information about Asoka is the inscriptions which, with an eye to remote generations, he ordered to be carved over the length and breadth of his immense empire. In the districts closer to his capital, Pataliputra (modern Patna) on the Ganges, the inscriptions were incised on pillars — great monolithic columns of finely polished sandstone, surmounted by ornate capitals that often bore lions or other figures that rank among the finest examples of animal sculpture the world has known, the whole monument being forty or fifty feet high. In more distant portions of the realm, the royal edicts were carved on the faces of cliffs or huge boulders. One who cuts his words into hard rock can not afford to waste them; and in the following account I shall, to a considerable extent, allow the Emperor to tell his own story. The quotations from the edicts are from the English translations given by Vincent A. Smith in the third edition of his book *Asoka*, published in 1920 by the Clarendon Press.

In her short sketch, *Asoka, Emperor of India*, Hilda Seligman states emphatically that after his conversion to Buddhism Asoka disbanded his armies and, amidst all the war and turmoil of the third century B.C.,

Some of the royal edicts of Asoka were carved on rocks, with animal carvings, such as this elephant of Dhauli.



maintained his rule by moral force alone — an experiment that more than two millenia later no government has the courage to make. Smith limits himself to stating that, although the Wardens of the Marches may or may not have been compelled to defend with arms the far-flung frontiers, Asoka never again waged a war of aggression. The Fourth Rock Edict declares that the reverberation of the war drums has become the reverberation of the Law; but the army is not specifically mentioned in the available inscriptions. There can be no doubt, however, that the Emperor was remorseful of the cruelties inflicted by his early conquest, for in his Thirteenth Rock Edict he declared "that of all the people who were then slain, done to death, or carried away captive in Kalinga, if the hundredth part or the thousandth part were now to suffer the same fate, it would be a matter of regret to His Sacred Majesty." Then follows a sentence that reveals the grandeur of the man's soul: "Moreover, should any one do him wrong, that too must be borne with by His Sacred Majesty, so far as it can possibly be borne with." It is evident that he has come a long way from the "off with his head" attitude of the Oriental despot.

Asoka's chief concern was for the spread and devoted practice of the *Dharma*, or Buddhist Law of Piety, which he himself summarized in Minor Rock Edict II: "Thus saith His Sacred Majesty: — 'Father and mother must be hearkened to; similarly, respect for living creatures must be firmly established; truth must be spoken. . . . .Similarly, the teacher must be reverenced by the pupil, and fitting courtesy must be shown to relations. This is the ancient nature of things — this leads to length of days, and according to this men must act.' "

It is the second of these points emphasized by the Emperor — respect for living creatures — that is of greatest immediate interest to naturalists and conservationists. In pursuance of this policy, Asoka abolished the royal hunt, to which he had been addicted in his youth, and substituted for it periodical "tours of piety." The most famous of these devout pilgrimages took him to the site of Gautama Buddha's birth at Rummindei in Nepal, where he caused a carved pillar to be erected commemorating the royal visit. He also abolished the slaughter of animals for the imperial household, as he tells in his First Rock Edict: "Formerly, in the kitchen of His Sacred and Gracious Majesty the King each day many hundred thousands of living creatures were slaughtered to make curries. But now, when this scripture of the Law is being written, only three living creatures are slaughtered for curry [daily], to wit, two peacocks and one antelope — the antelope, however, not invariably. Even those three living creatures shall not be slaughtered in future."

Apparently, the "hundred thousands" of creatures were slaughtered to feed the army, and perhaps also the populace, in the Emperor's unregenerate days. Animal sacrifices to the gods were also prohibited throughout the realm. The Emperor was most insistent on this point, and the carved edicts often repeat the decree. "Merry-makings" accompanied by animal-fights, heavy drinking, and feasting on meat were forbidden, although theatrical performances and more decorous gatherings were commended.

One of the most interesting of the inscriptions, Pillar Edict V, concerns the conservation of wildlife and natural resources. The following creatures were declared exempt from slaughter — parrots, starlings, "Brahmany ducks," geese, bats, queen-ants, female tortoises, "boneless fish," river tortoises, porcupines, tree squirrels, stags, "Brahmany bulls," (?) monkeys, rhinoceros, gray doves, village pigeons, and all four-footed animals which are neither utilized nor eaten. The list includes a few others that the antiquarians can not with certainty identify. What government has ever published a more varied list of protected species? Doubtless the Emperor would have liked to go even further than this and prohibit all killing, but he was aware that it is a dangerous policy for even a powerful monarch to attempt to effect too radical a change in his people's habits in the course of a few years. Many of these animals not

(Continued on page 218)

Flowering river plums along the old stone wall of the Arboretum at Chapel Hill, seat of the University of North Carolina. This display annually brings admirers from all parts of the State.

Wild Plums Are Real Americans

By CHARLOTTE HILTON GREEN

Photographs Courtesy of Dr. W. C. Coker

"SPRING is the season of the eye," says a Japanese poet. And surely, in the Japan of old, with its hundreds of thousands of flowering cherries, it must have been a "season of the eye."

America, too, could have this nationwide bloom of spring, if we would but learn to make the most of our gift of flowering trees — dogwoods, wild plums, hawthorns, service-berries, wild cherries, mountain ashes, wild crabapples, flowering ash, redbuds. What a wealth of woodland bloom we have!

But this time my song is of the wild plums, alone — wild plum thickets of the Chickasaws; the larger and more artistic trees of the Canada plum of the North and West; the southern form, the river plum. Between them, one or another of these plums may be found from Newfoundland and the St. Lawrence west to the Rockies and south nearly to Florida and the Rio Grande. Still another form is native in parts of the far West.

Our wild plums are real Americans. Long before Columbus, or even the legendary Norsemen, set foot on these lands, the Indians were gathering the fruits of the wild plums, some of the thriftier tribes even drying large quantities for a winter fruit supply. So well distributed are these wild plums that nearly every section of the country has its own variety, sometimes several species, and each can be improved with cultivation.

With cultivation, too, the bloom as well as the fruit is improved, and more and more the wild plums are being used in landscaping for their grace and beauty, their spring flowering, summer fruit and green foliage, and autumn coloring.

Not only can they be improved in themselves, but our native wild plums are of such sturdy stocks that they have been widely used to infuse new life and hardiness into the cultivated plums which came to us by way of Europe. Through cross-breeding these native plums with the cultivated ones, plant-breeders have combined the hardy, self-reliant, disease-resisting qualities of the former with the improved flavor, texture, and size of the latter.

There is much variability in the size, quality and profusion of bloom of our wild plums. As flowering trees some of them rival, or even excel, the far-famed Japanese cherry in delicacy and beauty, according to Dr. W. C. Coker, Director of the Coker Arboretum at Chapel Hill, and former Head of the Botany Depart-

ment at the University of North Carolina, Chapel Hill.

As an ornamental tree, the river plum of the South, in particular, should be developed and used more in artistic, naturalistic plantings, says Dr. Coker, who is responsible for the Arboretum and for much of the landscaping of the University Campus and also much of that of the lovely village of Chapel Hill, which makes it one of the show places of the South. Dr. Coker has been working on the development of several river plums he has discovered in the woods about Chapel Hill, some trees with unusually large blossoms, some with more delicate coloring, and some with a longer blooming period. One tree in particular had flowers bunched in considerable clusters and were, he thought, as handsome as any white-flowered Japanese cherry he had seen.

There is artistry in every wayward branch of a wild plum. Color, bark, thorns, branching — all add to the beauty of Nature's etchings when seen in the winter landscape. Out of her largesse, Nature has given us, in her wild plums, beauty for which the Japanese have worked in their cherries for centuries; some claim for thousands of years. With an artistic skill and patience unknown to western peoples, they have worked towards furthering this beauty. Not for flowers only, but for color, texture, leaves, branching, bark — for the perfection of the tree as a whole.

We, too, could do much for our native flowering trees. The fruits of the river plum vary from red to yellow and many shades between, and are a little under an inch in diameter. At times, and in certain lights, these fruits glow like jewels. On my "Memory Chain" of birds and flowers I recall a summer day in Pinehurst where, from a large picture window, I saw a group of cardinals, three males and two females, feasting on the fruits of a large river plum. The plums, varying in color from opaque yellow to carmine and dull purplish-red, seemed almost to repeat the color scheme of the birds.

Again, in my own woodland, I remember a tangle of Chickasaw plums with a yellow jessamine vine rioting over it, and a bluebird warbling its carol to spring from a flowering top spray. A bouquet of birds and flowers, that! Still again, down on our Carolina coast, a wild plum in bloom, the flowers partly hidden by the veil of gray Spanish moss that draped the tree, like a nun hiding her worldly beauty behind voluminous robes. A parula warbler, just up from the Indies, or perhaps Mexico or Nicaragua, was flitting about. Doubtless this was the northern parula, and the veiled tree may have been a familiar way station. Later, the southern parula might build its swaying nest in this same Spanish moss, in this, or some nearby tree.

Gray of moss, creamy-white flowers, and blue, green and gold of bird! Surely, Nature can create some artistic effects on her great canvas — and they should all be strung on our memories as a precious rosary.

"Some beside the zigzag fence
Lean their foreheads white and pure;
Some above the broom-sedge dense
Reach white arms in spicy lure,
Like fair Naiads breathing balm
Of the mellilite and palm."

Old silvery gray zigzag fences and wild plums seem to belong together, as in the setting of the poem by Samuel Mintern Peck. In such a tangle, at the foot of the old rambling fence half-hidden by the plums leaning their foreheads white and pure over the rails, I once flushed a bob-white. Was she investigating a nesting site, I wondered? If so, how ideal a setting!

All about was the loud buzzing of hundreds of bees swooping down like buccaneers into the blossoms, while overhead white billowy clouds floated lazily by in an azure sky. From the top of a neighboring cedar a brown thrasher sang out his heart.

Birds and flowering trees and springtime! They all belong together, and to that rosary of memory pictures I add constantly the singing birds and nesting birds and wee nestlings stretching their wings that I am always looking

There is artistry in every thorny, wayward branch of a wild plum.

Some native plums have flowers that rival those of the Japanese flowering cherries, says Dr. Coker of the Arboretum. This one he has named "Snowball," so large and thick are the clusters.

for when our native flowering trees are in blossom. It is a fascinating collecting hobby (so much better, for me at least, than a friend's one of collecting little pitchers, which require eternal dusting, and "don't touch's" to little children) that adds zest to every outdoor tramp or leisurely motor trip.

The Chickasaw plum is usually the plum of the wild plum thickets in the South. Smaller than the river, or the Canada plum, it spreads by numerous suckers, thus forming the thickets so common on the edges of fields and in waste places from the coast to the foothills in all our southern states. It is easily distinguished from the river plum by its habit of growth and by its small, shining leaves, which are strangely trough-shaped instead of flat. Like that of the river plum, the fruit is red and yellow, sweet and rather edible, and makes fine preserves.

These plums are the first to bloom. Here in Carolina, along about mid-February or early March, my soul begins to yearn for wild plum blossoms and I go hunting them. In some favored spot, perhaps a protected hillside facing south, I usually find some with swelling buds. The Chickasaw flowers before it puts out any leaves, the river plum when the leaves are nearly grown, and the Canada plum with or before the leaves. A few dark, thorny branches full of opening buds (they force easily) in a dull blue or gray pottery jar makes an artistic Oriental arrangement that brings spring and the "season of the eye" into a room, even though it may still be bleak outside.

True southern trees are these Chickasaws, for they are now widely naturalized in the South Atlantic and Gulf States from southern Delaware and Kentucky to central Florida and eastern Texas, occupying the margins of fields and other waste places near human habitations usually rich in soil. Sargent says their origin is still uncertain, but there is an ancient Indian tradition that they were brought from beyond the Mississippi by the red man's forbears, and that the red men, too, appreciated the glowing fruits.

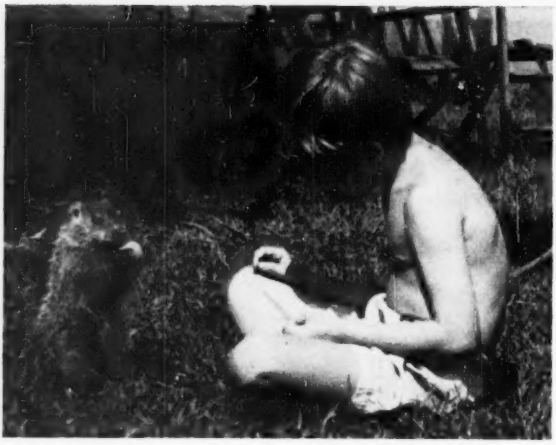
All of these wild plums take easily to cultivation. Nor are they difficult to transplant. The Chickasaws can be pruned to be thick, small trees, bearing a profuse bloom, or left to their own artistic though wayward growth. The river plum develops a graceful broad or rounded top with spreading, thorny branches, and a short trunk with grayish-brown raggedy bark, which separates into large, thin, clinging plates that are also artistic. Thornier than the Chickasaw, the river plum is exquisite in its bare beauty of winter, in its airy white, or flushed-with-pink bloom of spring, its green foliage and fruiting of summer — and oh, in autumn! I always wonder whether my river plums are lovelier in spring than in autumn, when they are gypsy hoydens flaunting gay colors recklessly and prodigally.

Of course, the fruits of all these wild plums attract the birds. But the trees furnish more than a winged wayside cafeteria. River plums, in particular, make good nesting and roosting sites. We always have some of them about our grounds, both for beauty and for the birds. Our home has long been a bird sanctuary, with food and water, nesting sites and cover. Wherever there are birds, alas, their enemies also appear, and establish look-outs near-by. Several times we have seen a Cooper's hawk about our grounds, and more than once I have seen a small terrified bird take refuge within the thorny plum where the larger hawk could not follow.

Wild plums have played a minor role in the early settling of our middle-West. Out on the prairies they often furnished such welcome fruit to a fruit-hungry people in an almost fruitless land that early settlers sometimes organized neighborhood "plum-gathering picnics." One of my earliest recollections is of a family and neighborhood picnic and "plum picking" on the banks of the Little Cedar (Continued on page 219)

Our Groundhog Plays Tag

By AUGUSTA HANDEL



"Poor little thing, longing for the great outdoors," Granny said, as she watched our groundhog sitting on the windowsill gazing wistfully at the green lawn outside, where the children were playing tag.

"We'll let him go as soon as he is old enough to take care of himself," I promised.

At that point, he was much too helpless to be released. The only foods he could take were bananas, milk and cod liver oil. And he would not eat anything unless I held him in my lap and stroked him encouragingly. He was still at the nursing age and needed fondling and caressing in order to thrive on artificial feeding. Two and a half months later he ate cherries, apricots, raw carrots, cauliflower, and whole wheat bread; liked to feed himself.

The children, Michael, Tommy and Bert, insisted on his dining with them, which he did sitting solemnly on his haunches on a high stool and helping himself from a paper plate on the table. He held his food in his paws, sitting upright, like a squirrel.

Observing this, Michael often said, "He's a boy. He got hands."

"Yes," Bert agreed, "He gonna eat wif spoon when he get bigger." We would not have been surprised if he had done so.

Finally I decided it was time for our groundhog to become acquainted with the outdoors. He wandered around disconsolately for a few minutes. Then, suddenly, he discovered the back steps. He ran up them like a flash and waited to be let in the kitchen door. I took him back to the middle of the yard, hoping to see him start doing something natural, such as digging or tasting the bushes. He made for the kitchen steps again. I took him to a spot of freshly turned earth. He sprinted back to the kitchen door. The next day the story was the same, and the day after, too.

Granny suggested that maybe he was afraid outside, and that the best way to stimulate his digging instincts might be to provide him a chance to exercise them in the house. So I laboriously carted soil to his favorite corner of the basement. He took one look at it, went and tipped over the waste-basket, carried all the paper that was in it over to the mountain of earth to cover as much of it as he could. Some earth still showed. He nervously explored the entire basement looking for more paper. Finally he got enough to hide the earth completely from view. That done, he never went near it again.

I continued taking him to the yard every day. One afternoon, however, I did not get around to doing it until after Tommy had gotten home from day camp. The groundhog had started purposefully for the back steps when he saw Tommy running across the lawn. He stopped in his tracks and gave a low whistle. Then he started chasing Tommy. Tommy circled the metal lawn table. The groundhog raced full tilt after him. Round and round they went, the groundhog keeping up a happy throaty whistle. Finally, Tommy stopped to catch his breath. The groundhog stopped to catch his. Tommy started to run again. The groundhog gave chase. Michael and Bert came out. The groundhog chased them. Their short legs do not carry them fast so he passed them and they chased him. When the whole group was exhausted, they sat down for a rest and the groundhog fortified himself with a banana. Then the game started again. The groundhog was willing to stay outdoors as long as it lasted. Evidently it had been no romantic "call of the wild" that had drawn him so often to the window in his babyhood. It was just a boy-like wish to join the gang and play tag.

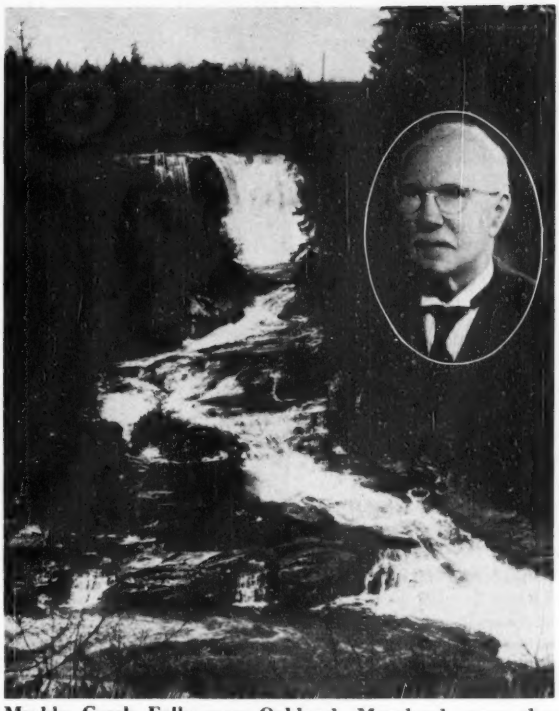
Example

By JOHN D. ENGLE, JR.

The plant that blooms upon the ocean's floor
Is unaffected by the surface storm.
The seed that sleeps beneath the winter snow
Holds fires that keep the future flower warm.
The larva living in its dark cocoon,
Knows well that darkness always yields to light.
And I, observing that these things are true,
Light flames of faith that burn the threatening night.

Wild Flowers Are His Friends

By MARY ZOOK



Muddy Creek Falls near Oakland, Maryland, near the campsite of Thomas Edison, John Burroughs, Henry Ford and Harvey Firestone. Inset is a picture of Dr. Joseph E. Harned, local druggist-botanist, who came to know these visitors through his work with the wild flowers of the region.

For nearly sixty years Joseph E. Harned has been the leading pharmacist in the town of Oakland, located in that westernmost bit of Maryland that seems almost an appendage of that State. Now eighty years old, this mild-mannered, bespectacled gentleman with silvery hair and a piccadilly collar, is frequently to be found deeply engaged in conversation with his friends and neighbors who drop into his store. His pharmacy is a cheerful place, and from early spring until the snow flies there is a bowl of fresh wild flowers on the counter. Sometimes the folks want Dr. Harned to identify some specimen of wild flower for them, other times they need a prescription filled, and on still other occasions they ask his advice. Because of his fame as a wild flower authority, many Oaklanders seem to feel that the kindly pharmacist should be able to solve their personal problems.

Dr. Harned's fame, however, is not confined to Oakland, or to the filling of prescriptions and the sale of toothpaste and double chocolate sodas. He is known far more widely for the fact that he has spent the major part of a lifetime producing a remarkable and thoroughly original book — *A Guide to the Wild Flowers of the Alleghenies*. This book brought him to the acquaintance of such men as Edison, Burroughs, and Einstein, and has caused Dale Carnegie to say of Joseph Harned that here was "one of the happiest men in Maryland — a happy man because he had enthusiasm for something outside himself; something he can share with others."

Joseph E. Harned's interest in wild flowers dates back to his boyhood, when his mother gave him his first insight into the beauties of Nature. His parents were Pennsylvanians and lived in the town of Harnedsville, named for his father, but they moved to Oakland, Maryland, in 1870, where their only child was born. Later, walking three miles back and forth to a little one-roomed school house, the boy learned to keep his eyes open.

When he was fourteen years old, Joseph's mother died, and he was sent to live with an uncle, but he never lost his love for the birds and flowers with which his mother had imbued him. Finishing high school, the young man taught a year and served also as an apprentice in a drug store. Realizing the need for more training, he entered the Philadelphia College of Pharmacy and Science. While there, Harned was greatly influenced by Professor John M. Maisch, a descendent of the great botanist, Linnaeus, who stimulated the boy's love of wild flowers, in particular those of medicinal value. By this time, young Harned owned his own microscope and frequently made field trips outside the city.

After graduating, Joseph Harned opened a drug store in Mountain Lake Park, Maryland, but removed the next year to Oakland where he is still active as a druggist, after nearly sixty years. His fine standards of professional conduct resulted in his being chosen as Honorary President of the Maryland Pharmaceutical Association.

It was the druggist's love of wild flowers, however, that brought him to the attention of the scientific world. On his vacations and days off, Harned roamed the fields, marshes, woods and waysides, drawing and collecting specimens. After years of this study he conceived the idea of placing his observations in book form. Writing in pencil, the botanist gradually assembled his manuscript, frequently sorting notes and checking facts

Spring has arrived. Dr. Harned inspects a clump of hepaticas.

far into the night. He included myths and legends connected with certain flower families, as well as suitable verses, along with the careful identification data and authentic drawings. But this material only covered western Maryland, and a Harvard professor pointed out that the book would be far more valuable if it covered a larger area. So Dr. Harned laid aside his notes for the time being and spent fifteen more years wandering about in various parts of the United States gathering further data for his book, which eventually was to cover 1500 varieties, although restricted to an area east of the Mississippi River.

Like most collectors of wild flowers, Dr. Harned encountered poisonous reptiles, but he has never been bitten by any of them. He says his worst scare did not come from the creeping or four-footed animals, but from his own species. Botanizing in North Carolina some years ago, he was accosted in a deep wooded hollow by two men who gave him to understand that he was not welcome. They looked him over, asked some questions, and finally invited him to get out, pronto! He did. When he reached his hotel, he was informed that he had been in the most notorious "moonshine area" in the whole State, and that he should be thankful to get back alive.

One of Harned's pleasanter experiences while collecting specimens was the great thrill he felt on discovering a large colony of showy ladyslipper, and acres of *Sarracenia*. In the course of his collecting he discovered four varieties that no other botanist had listed, but which are now listed and placed in the National Herbarium collection of the Smithsonian Institute in Washington, D. C.

One of his discoveries was the swamp clintonia, a member of the lily family, which Dr. Harned found in a swamp in what was probably at one time a gigantic pine forest about a mile from the village of Cranesville, Pennsylvania. Another was the leather-leafed goldenrod, which he located on a botanizing trip near Cumberland, Maryland, with the late professor, George M. Perdew. The variety is seen four to six weeks earlier than other varieties.

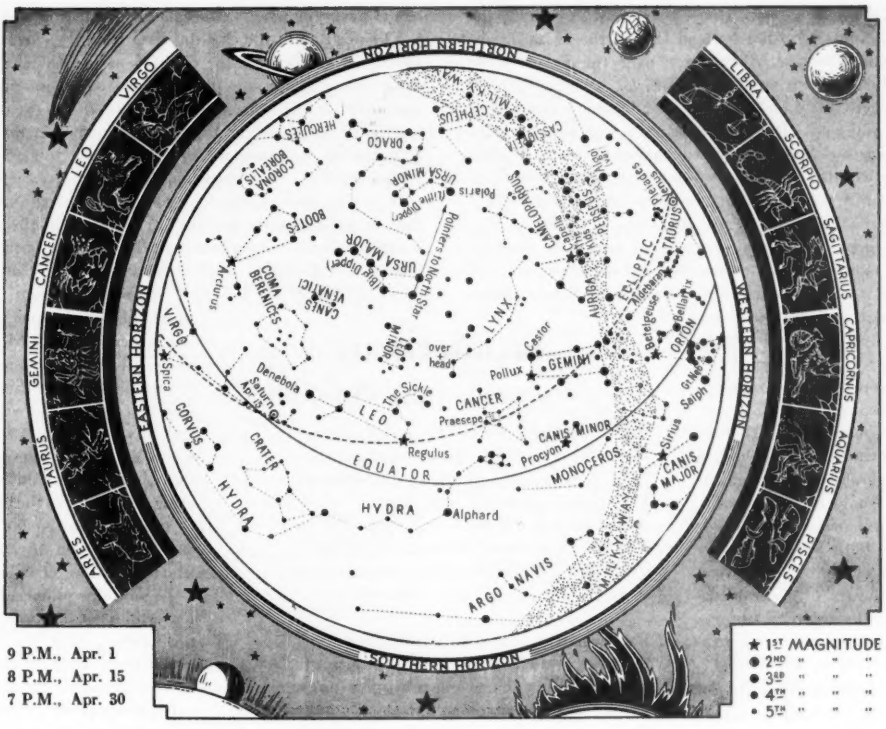
The third discovery was the mountain thoroughwort, which is called *Eupatorium harnedii*. This resembles the familiar joepyeweed, but differs radically in important respects. The fourth and most beautiful of his discoveries was a white double trillium, which was found in the woods along the Cheat River in West Virginia. The flower of this trillium looks like a large white orchid, and has no floral organs except petals, since it is propagated from the root.

By 1931, Dr. Harned's book was ready for the publisher, but, while proofreading it, he suffered an eye hemorrhage. Dr. Edward T. Wherry, of the University of Pennsylvania, Dr. Benjamin L. Robinson of Harvard University, Dr. Karl M. Wiegand of Cornell University, and others, collaborated to proofread the entire book for him.

The book was an immediate success, because it was valuable to student botanist and amateur. The second edition was larger than the first, and contains 722 pages, some 400 drawings and sixteen beautiful colored plates, painted by Mary Eaton, F. Schuyler Mathews and others.

The fascinating manner in which the material is presented is no doubt responsible for the delight that wild flower lovers take in Dr. Harned's book. The author thinks and writes of flowers as friends, and refers to "flowers that steal a ride," "plants that provide entertainment," "flowers that turn night into day," and "plant marriages and the guests that aid in the ceremony."

That the book is highly regarded by scientists, is proved by the comment of Dr. C. L. Shear, of the United States Department of Agriculture, when he said; "The book is certainly a great credit to the author and everybody concerned. The work should appeal to all lovers of plants, and especially to amateur botanists." From across the sea came this (Continued on page 216)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Earth-Moon System

By ISABEL M. LEWIS

IN THESE days of great scientific achievements there are some who like to play with the idea of a rocket trip to the moon, although there seems scant prospect of the development of a sky ship capable of making this trip, or of obtaining a crew so skilled in celestial navigation that they could land it on our satellite and later return to our own planet.

Earth and Moon form a pair unique in our solar system. No satellite is as large in comparison to its primary, or body about which it revolves, as is our own Moon in comparison with the earth. It is one-fourth as great in diameter, one-sixteenth as great in surface area, and contains, *in a volume about one-sixty-fourth that of the earth*, one-eighty-first as much material. The moon turns once on its axis in the period of its revolution around the earth from new moon to new moon. Its motion on its axis is uniform. Its motion in its orbit is not uniform, but, obeying the law of areas, it moves most slowly when farthest from the earth, and most rapidly when nearest to it. From this and several other causes there arise the librations of the moon as a result of which there is about 41 percent of the lunar surface that is always visible from the earth; another 41 percent that is never seen from the earth. The remaining eighteen percent is within a zone of the surface lying between these two regions from which the earth is alternately visible and invisible as it sways back and forth through a small angle in the lunar heavens. The 29½ days that it takes the moon to make a trip about the earth from new moon to new moon measures the length of one lunar day. For half of this time, 14 days and 18 hours, the sun is above the horizon and for an equal length of time it does not rise.

How different are these two worlds! First, the earth teems with life both in the depths of its oceans and on its surface. It possesses everything essential to the development and support of life. Its extensive atmosphere blankets it from unendurable extremes of heat and cold. Rainfall refreshes its surface and helps produce an abundance of vegetational growth. Weathering eventually removes scars that may have been formed by collisions with great meteoric masses through the ages. Similarly produced scars have left permanent pock marks on the face of our own satellite.

In sharp contrast to this favored world of ours, the moon is a desolate world that has lost whatever atmosphere it may have originally possessed because it lacks sufficient gravitational attraction, due to its small size, to retain it for any long period. Since there is on the moon no atmosphere, there are none of the effects that would be produced by its presence. The sky is black both by day and by night, as there is no scattering of rays of short wavelength by molecules of gas in an atmosphere and a resultant blue sky, twilight, sunrise and sunset tints. All of these atmospheric effects with which we are so familiar on our own planet do not exist on the moon.

Since the lunar sky is black both by day and by night, except in the direction of the heavenly bodies, it is densely studded at all times with countless stars that shine forth with a splendor unknown on earth.

One needs no eclipse of the sun to observe the solar corona and its ever changing forms. Against the inky blackness of a day-time sky the corona shines forth at all times that the sun itself is visible. When the moon passes into the shadow of the earth at the time of a lunar eclipse, as viewed from the earth, an observer on the side of the moon turned toward the earth would see the "new earth" completely concealing the sun, although its outlying coronal streamers would extend beyond the earth disk. At the same time there would be seen a beautiful halo of reddish-tinged light encircling the earth, produced by rays of sunlight shining through the earth's atmosphere in its regions of sunrise and sunset that surround the earth's disk. When, at time of new moon, there is a total eclipse of the sun, as viewed from a portion of the earth's surface, the earth is "full" and fully illuminated by the sun's rays, as seen from the moon, except for that portion of the earth's surface over which the large, dusky, penumbral and small black umbral shadow are seen to pass. This is the portion of the earth's surface within which the sun is partly or wholly concealed by the moon.

The position of the earth as seen from the surface of the moon varies with the position of the observer on the moon. At any one place it always remains nearly stationary in the lunar sky, except for the slight rocking to and fro caused by librations. The nearer the observer is to the center of the side turned toward the earth, the higher the earth appears in the sky. If the observer is close to the edge of the side of the moon that is turned earthward the earth is low in the sky. In this position it may, through librations, alternately appear and disappear at the horizon. There is, on the opposite side of the moon, of course, the region from which the earth is never seen. It is generally assumed that there is little difference, on the whole, between the surface features on the visible and invisible side of the moon Yet one may imagine that curiosity would soon bring our visitor to the moon to the side that so far has never been seen by those who inhabit our own planet.

To be well equipped for a sojourn, however brief, on this airless, cloudless and lifeless little world one would have to be supplied not only with life-supporting oxygen, food, and water, but also with some protection against the tremendous range of temperature that exists between lunar midday and midnight. The surface temperature of the moon varies from about 212 degrees Fahrenheit at midday, when the sun is near the zenith, to about 250 degrees below zero at midnight. Within one hour during an eclipse of the moon within the shadow of the earth a drop of 270 degrees Fahrenheit has been recorded. Near the time of sunrise a more endurable temperature of about 60 degrees below zero has been recorded, and the visitor to the moon would find it to his advantage to favor the sunrise and sunset regions of the lunar surface.

One hesitates to write off the moon as a completely dead world. Close to its surface, in cracks and crevices fed by exhalations from its countless vents, crater pits, and craterlets, certain low forms of vegetation may exist. Snow, hoar frost and ice may be present on the lunar surface, even though water is lacking. There is evidence that volcanic action occurred on a tremendous scale in the far distant past. Some believe that the great maria, or so-called seas, that cover more than half of the surface of the moon, and are to be found largely in the northern hemisphere, were covered at one time with great lava flows. This portion of the lunar surface differs greatly in appearance from the high mountainous plateau (Continued on page 217)

Prometheus

By JOHN GALLINARI WHIDDING

Bright wanderer, far falling out of space
Down all the figured vastness of the dark,
What mind devised your long trajecting arc,
What hand propelled you from a secret place?
Star-obstacled the path and swift the pace!
Yet, by your cresset's fierce eternal spark,
You speed the planet-gauntlet long and stark;
A bold, swift runner on an endless race.

Prometheus, fair god, who from the peak
Of heaven stole man's priceless gift of flame,
Who won from chains and tearing vulture beak;
Behold him still involved in headlong flight
Toward some cold other world as once he came
To ours — a comet hurtling through the night.

The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education. The American Nature Association

CONVENTION PERIPATETICS

THIS is written immediately following attendance at the annual meeting of the American Association for the Advancement of Science in Cleveland, where I made a special effort to learn what was going on in the science teaching field. Since many teachers will themselves be attending teachers' meetings, it may be appropriate to consider an estimate of a national meeting to use as a check against what may happen in a more local gathering. It is my impression that there is not much basic difference, and that there are good and bad, sublime and ridiculous, sensible and absurd, profound and superficial, heavy and light experiences to be found at any convention. Many of the most worth-while experiences may be found at the organized activities, and equally important considerations may attach to little things that happen behind closed doors, or between two persons on a seat in a hotel lobby. Let us consider a few of my experiences at this recent meeting.

In the last hour that I was in attendance five persons came to me with inquiries as to the possibilities of continuing graduate work in nature and science education at Cornell. An equal number in the same hour made inquiries as to where they could get jobs, or get persons to fill jobs — there were more of the latter. It would seem, from this, that one possibility of a convention attendance might center around professional improvement and advancement. I think it is a very real feature of such meetings. Let us see how important and superficial these may be.

One meek young lady who wished to take up graduate work at Cornell admitted that it was in part because her boy friend would be there this next spring. She wished to be a science teacher. She had had six hours of college botany and equal amounts of physics, chemistry, geology and zoology. She had had the required eighteen hours of professional education for certification in New York State. Her grade average in academic science was seventy-one, but she needed an additional year of graduate work, or a Master's degree. She wanted my help. She was already registered in the graduate school of one of the major metropolitan universities and, to prepare herself as a science teacher, was taking courses in history of education, which she had had; philosophy of education, which she had had; the teaching of English; the teaching of science, which she had had; religious education, and the junior high school. She understood that if she could get present graduate credits in any work, for the remainder of the year and from any institution, she could get her Master's degree from the institution in which she is now registered. The trainer of science teachers in her institution has never had, himself, a course in college botany, zoology, physics, chemistry or geology, although he does have a doctorate in science education. If you had been in my boots what would have been your reaction to the inquiry? I doubt if she comes to Cornell. I rather doubt if she interviews me again. I do hate to interfere with romance and keep the lady from her boy friend, but my natural inclinations to help Cupid are not enough in this case to give her the help she seeks.

On the other hand there were men and women with years of successful teaching experience, with superior academic backgrounds, with stable romantic lives, who really want help. The question is, can we fit them into the framework of opportunity presented by the facilities at Cornell and elsewhere. A professor from a New Jersey institution of the highest standing wanted someone to accept financial support for a three-year graduate project in Nature education. It was an ideal opportunity and a highlight of satisfaction to bring a student and this professor together. This sort of thing, multiplied many times at the Cleveland meeting and elsewhere, is one of the things that makes it worth while to attend these meetings.

Of course any gathering of thousands of persons finds a few who, for one reason or another, find unique methods of using their spare time. A year ago in far off New Zealand I wanted to contact an education leader and was told at exactly in what bar I would be likely to find him, and there I found him. Many times these people have important contributions to make, aside from the amusement they provide by their somewhat unconventional behavior. Particularly do I remember the change in tempo that was evident with some in the audience while an able person, slightly "under the influence," attempted to emphasize a point by the use of rather unconventional language. Getting away from things is a part of the convention technique. I did it at this meeting, but not by going to a bar. Instead, I took a couple of students and a friend to see "Harvey."

This is not the time or place to discuss all the decisions that were made at the recent convention I attended, or even to consider the progress made towards reaching other decisions. I can say, however, that, when I compare the present convention with the first one I attended of the same group back in 1916, there is every reason to feel that we are making progress. The groups interested in nature and conservation and science education are bigger than they were then. They are more solvent financially. They are more serious in the way they attack problems, and possibly a bit freer from emotion. There may be as much "politics" in the picture as there used to be, but if it is so I did not notice it.

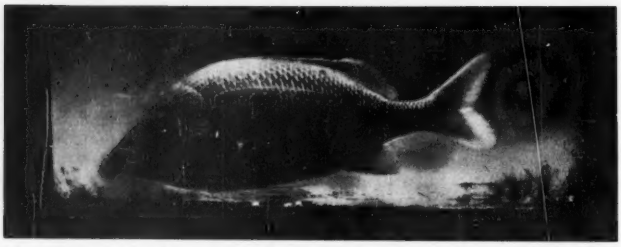
The most gratifying experiences are those that go with noticing how things that you have long waited to happen are really happening. More than thirty years ago, at one of these meetings, I gave a paper advocating a greater emphasis on conservation education in our science offerings. For many of the recent years at the national conventions the conservation education ball has been carried either by the American Nature Study Society, or by the National Association of Biology Teachers. This year they let up on this emphasis, and, sure enough, there was a session on conservation education sponsored by the National Science Teachers Association, which had hardly considered the subject in the past. This is all to the good, and it points out how you cannot get a true picture of trends by attending a meeting only now and then. A consistent attendance over a period of years gives a perspective that is significant. In the present case the perspective is most gratifying.

I wish I might write further on this subject, but the opportunity is not here. I should comment on the busy "big shots" who attend meetings only when they themselves are giving papers. How they can lift themselves by their own bootstraps I do not know, but every convention has this type of person there. Then we have the convention members who really get caught up on their sleep, in meetings and out, and the individuals who do not sleep at all up to the time the train pulls out for home, whereupon they pass out with exhaustion. There are the parasitic professional writers who attend meetings as a means of getting meat for their articles without having to go to the trouble of getting basic experiences, or even going through the literature.

There are the highbrows who do a wonderfully meticulous piece of research and read their reports in such a way that no one gets anything from them, and the lantern-slide talkers who get their slides mixed and bottom-side-up all at the same time. There are the young sprouts who feel that erudition is shown only by the use of such words as salmonids when they mean salmon, and who would speak of cave researchers as cryptozoic speleologists. In addition, fortunately, there are the really big men who present great profundities with such pleasing simplicity that you wonder if they really are as important as you know them to be. There are the exhibits and the book men who give and take, the hotels and taxi drivers who serve or fleece you. But over and above all these minor observations is the major conviction that at a convention you can grow if you give yourself the opportunity; you can help if you are willing to make the effort; you can increase your ego and develop your humility by mixing with those who know less about your field of effort than you do and more about their own. Taking it all in all, conventions are worth while. I am all for them and I hope that some day I may meet you at one.

Camera Trails

By
EDNA HOFFMAN EVANS



A larger fish can be photographed in an aquarium, too. It is kept within range by a secondary sheet of glass. The camera picks up discoloration and imperfections in the glass.

SINCE goldfish have little privacy at best, it may seem unsportsman-like to invade, with camera and film, what small amount of private life they do have. On the other hand, perhaps the goldfish do not mind. After all, to creatures that spend their lives in the transparent medium of a goldfish bowl, what difference can a few photographs make?

The above will serve, I hope, as an introduction to the second part of a discussion (which I began last month) on the technique of fish photography. In March I wrote about photographing fishes in large aquariums. This month I am going to deal with the ways of taking fish pictures at home. In doing this, there is no need to confine ourselves to goldfish. There are numerous possibilities, ranging from small native minnows, seined from a nearby pond or ditch, to extremely rare or exotic fish aristocrats imported from waters in remote parts of the globe. Nor need we consider fresh-water fish alone. Small salt-water fishes make interesting subjects, providing one has the aquarium facilities — air pump, filter, food, and the like — with which to keep them alive.

Next to the subjects themselves, the tank in which they live is of prime importance to fish photography. This must meet certain rather definite specifications. A round bowl or fancy shaped one will not do, especially if the photographer hopes to show his subject in an environment as nearly natural as possible. The tank or aquarium must have flat walls, made of as clean, unscratched, and unblemished glass as can be obtained. The ardent fish photographer, or one who plans to take a great many fish pictures for some reason or other, can construct his own photographing tank. This will be quite shallow from front to back — from three to four inches — while its length and depth need not be any more than twenty-four by eighteen inches. Techniques for tank construction may be obtained from any of several publications dealing with the culture and care of tropical fish.

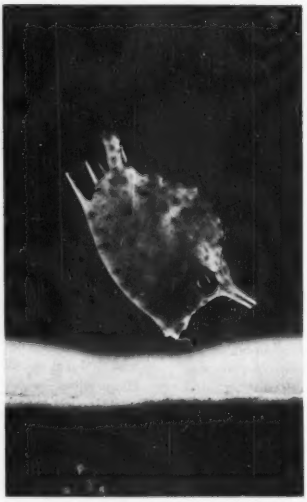
For those who do not care for aquarium construction, one of the readily purchasable rectangular aquariums, of either three or five-gallon capacity, will do just as well. Just be sure that the glass, particularly on the side that is to face the camera, is as clear and unblemished as possible.

Now we have the tank. Next comes the scenery, and then the fishes. In order to make the fishes seem as much at home as possible, aquatic plants of various kinds may be used. Small pebbles, carefully arranged, also help give a natural setting. Just be careful that the fishes and their surroundings correspond. Do not show fresh-water fishes with coral or sea shells, or top-living fishes with a pond-bottom setting. Or, unless you are intentionally playing make-believe, do not include any fantastic bric-a-brac like under-sea castles, mermaids, divers, treasure chests, and the like.

A sand or pebble bottom is best, for it not only gives a natural appearance but also provides a firm anchorage for the roots of aquatic plants. Just be sure there is no mud on the plants or rocks — a flick of a fish's tail can stir up an unpleasant murky cloud that must settle again before a picture can be taken. Anchor the plants firmly, otherwise a sudden movement may dislodge them and spoil the setting.

As for the fishes, they need not be giants. A two-or a three-inch subject will photograph just as well as a two-foot one, and certainly it will be much more manageable.

In the ordinary aquarium with six, eight, or twelve inches of water from glass front to back, there is always the difficulty of keeping the fishes within focusing distance. This is a problem when focusing on any kind of creature that is free to move about. But, in the case of aquarium fishes, the problem is easily solved. An ordinary sheet of glass, the same size as the inside length of the tank can be used to keep the fishes close to the tank front. It can be fixed firmly in the sand and the scenery can be built up behind it. In this way there is no possibility of the fishes swimming beneath a leaf or hiding away behind a plant stalk.



A small cowfish does a headstand.

Depending on its size, the fishes can be confined within a one, two, or three-inch space between the front glass and the secondary rear one. Leave enough room so the subject can swim easily although it may not be necessary to give width enough for it to about face. However, some fishes are apt to get stalled or pout in a corner unless they have room enough in which to turn around.

If the subject does not pose readily at first, wait awhile. It may be that the closer quarters bother him, so allow him to become accustomed to them. Under no condition should the photographer try to push or prod the fishes into position. In the first place, the fishes will not like to be pushed; in the second place, such treatment may actually injure the subject. Be patient. Focus the camera and wait. Sooner or later the fishes will swim into position and the picture can be taken.

When pictures are to be taken outdoors there is usually no need for auxiliary light. However, since it may not be convenient to move tank and fishes around, pictures can be made indoors under flood lights. Frequently a light from above is adequate and the water diffuses it sufficiently to prevent a glare. Just be sure there is no bright reflection into the camera from the surface of the water. This top illumination gives the most natural effect since light in the watery regions does come from above. Back lighting is tricky because of the possibility of glare or reflection and, if you use an auxiliary side light, be certain that there is no reflection or glare into the lens of the camera.

The glass of the aquarium, itself, is a highly potential source of reflection, both of outside light and of light reflected indirectly from the lens of the camera or

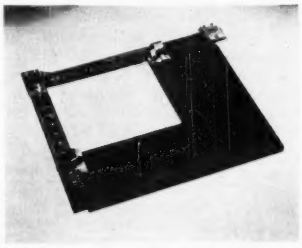
by bright objects behind it. The best way to avoid reflections of this sort is to set the camera at a slight angle, enough to deflect the light and yet not enough to distort the focus.

In the event that you plan to use flash lighting, make sure this will not be reflected in the glass. Results can be predicted, without wasting bulbs, by using a flashlight in the exact place of the flash attachment. If the aquarium does not reflect the flashlight, the chances are that it will not reflect the flash bulb either.

As for subjects, as I said before, there is a wide range of possibilities. Subjects can be natives of ponds and streams — small perch, sunfish, bluegills, trout, bass, and various of the so-called "mosquito fish," as well as tadpoles, small turtles, and frogs; they also can be exotic tropical fishes like mollies, angel fish, bettas, gouramis, moonfish, catfish, tetras, and dozens of others known to aquarium enthusiasts. The ever-popular guppies, however, are a bit too small and too active for effective photography. In the salt water field there are numerous possibilities — small cowfishes, sea horses and pipe fishes, spade fishes, "look-downs" or moonfishes, puffers of both the smooth and the prickly varieties, as well as all the gaily colored reef fishes that were mentioned as large aquarium possibilities in last month's section.

Naturally, a photographer who lives hundreds of miles from the sea coast will have difficulty in maintaining any marine species in a home aquarium. But, on the other hand, the fresh-water lakes, streams, ponds, and ditches in his vicinity — as well as the dealers in non-native varieties of fishes — will provide a vast assortment of photographic possibilities.

Thus the goldfishes and all their finny kin will pose readily and effectively for the photographer who will take the time and the trouble to set up his equipment in front of their glass-walled home.



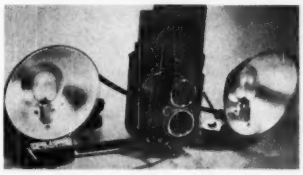
The new Eastman 11 x 14 Kodak masking easel.

SUPPLIES

In the line of new photographic supplies is the Kalart "B-C" multiflash and series extension unit with power enough to flash as many as six bulbs with extensions totalling 250 feet. There are models available for cameras both with and without built-in synchronization. More information on the unit may be obtained from Kalart, Dept. 91K, Plainville, Connecticut.

For those interested in darkroom work and enlarging, Eastman has a new 11 x 14 Kodak masking easel. Special features of the easel are a spring mechanism that holds the arms in position, and a support which holds up the arms while paper is being placed in the easel. A variety of margin sizes are possible. The device is available through regular dealers in Eastman products.

The Polaroid Corporation points out that both polaroid copies and negatives are now available. By ordering either through a dealer or directly from the company, Polaroid camera owners may obtain as many copies of a picture as they desire, or may order a negative made for fifteen cents and from this negative they can print their own copies. Envelopes are supplied with each roll of film to simplify the business of ordering.



The Kalart "B-C" multiflash and series extension unit has power enough to flash as many as six bulbs with extensions totalling 250 feet.

On John Muir Trail

Organization of another schedule of two trips over California's famous 200-mile John Muir Trail in the High Sierra is announced by Joseph C. Wampler, archaeologist-mountaineer, of 1940 Hearst Avenue, Berkeley 9, California. Each trip is for four weeks, afoot or on horseback, but arrangements have been made so that it is possible to join the party for one, two, three or four weeks. The parties are made up of about 35 men and women from all walks of life but with a common interest in mountains and the outdoors. Mr. Wampler will be glad to provide details.

Scientific Fringes

Borderlands of Science. By Alfred Still. New York. 1951. The Philosophical Library. 424 pages. $3.75.

In the opening paragraphs of this book the author outlines his objective when he writes: "This book is not a history of science; neither is it a history of magic; it is an attempt to evaluate the influence on civilization of both science and superstition — knowledge and belief, and to consider critically those 'borderland' phenomena which the scientist rarely investigates notwithstanding that they occur in the natural world which he shares with the unreasoning multitude."

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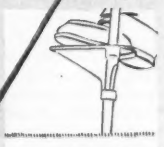

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SOIL AIRE

SPRING COMES TO JACKSON HOLE

(Continued from page 189)

common yellow flower, the blue of a bird's wing and the melody from a lark's throat. But that was what happened.

The wind was glueing snowflakes against the car-windows as we rattled over the cattle guard to the entrance of the yard at home. Smoke curled from the chimney of our log house, looking warm and inviting.

"It's still snowing juncos," I said, for the birds dipped and winged through flakes of white, which instantly changed to water on the brown bare earth. And, although the Tetons were blotted out as in winter, this was spring in Jackson Hole!

There is a song in that perennial season of resurrection; a song filled with the music of rushing mountain torrents, and the scent of fresh sage above the sighing of lonely western winds; a song of spring unlike any other symphony of the seasons.

I knew its haunting, provocative notes well. The elk and the juncos, and the sturdy yellow dandelion knew it, too!

WIND—DESERT ARTISAN

(Continued from page 190)

Creeping over vast, flat-floored basins, or piling up against precipitous mesa walls, sand dunes give to the Southwest one of its many distinctive surface forms. Vast accumulations from weathering, and from its own constant "sand-blasting," are built by the wind into dunes of varying design. *Barchanes*, or migrant crescentic dunes, are formed where isolated sand heaps are driven before the wind in sickle-shaped pattern. *Elephant-head dunes* result as resistant vegetation—tenacious sandbinders—hold and hump transient sand particles against the wind; and under this protection long, proboscis-like ridges trail from the anchored mounds to leeward. Dunes of the Devil's Playground in the Mojave, the great Algodones Dunes of the Colorado, and those of Death Valley are among the most intriguing features of the American desert. Their scimitar-shaped crests, curving contours, rippled slopes, and deep, shadow-filled troughs compose the motif in which is caught all the primal magic of desert light, sky, and color.

Ventifacts are sand-blasted pebbles whose faceted, highly polished surfaces indicate long exposure to wind-cutting. Commonly they exhibit three, sharp-edged, nearly equal faces tapered towards the ends, a peculiar and distinctive shape that results from an occasional shift before the prevailing wind during age-long processing.

Wind is the only weather agent able to carry eroded earth-mantle outside the boundaries of many desert basins and similar areas of interior drainage. Lifting swirling clouds of dust high into the upper air, and sweeping fine sands before it, a strong wind may transport its load far beyond interior divides. Thus wind-blown dust is deposited as rich, unstratified *loess* in regions where streams can renew its journey to the sea.

Despite many evidences of the wind's work, it does not compare with running water as a major erosive force, even in arid lands of the Southwest. Surprising to wasteland campers, familiar with the keen, cutting edge of sand-laden blows and alkali dust storms of the Mojave, Colorado, and adjacent deserts, is the geologist's conclusion that wind abrasion is of only local importance. Proof becomes evident, however, in the observation that across vast reaches of the Southwest rock surfaces remain rough from atmospheric weathering; and *desert varnish*, exceedingly slow in its formation, accumulates upon them. This black, shiny patina, with which time glazes cliffs and boulders, is composed mainly of manganese dioxide. Scientists believe that the activity of lichens on rocks containing the mineral is largely responsible. Thus these strange, darkly tarnished surfaces testify that unless the wind is vigorous, persistent, and well equipped with cutting tools, it is an ineffectual desert sculptor.

NOTES ON JOHN BURROUGHS

(Continued from page 186)

latter trips, which stated that the camping party had included among its members "a Mr. Burroughs of the adding machine company."

After Burroughs' death, Henry Ford purchased *Slabsides* and Burroughs' birthplace near Roxbury (then known as Woodchuck Lodge), where the naturalist is buried. The former retreat was later presented to the Burroughs Memorial Association, but Ford retained the Roxbury property. "Ford wished to purchase the bark study at *Riverby*," Julian said, "but the family would not consent to its sale, as he wished to move the study, with all its contents, to Dearborn."

A caretaker, employed by the Burroughs Memorial Association, watches over *Slabsides*. "If there wasn't some one around," Julian said, "souvenir hunters would carry off the place. We had to lock up the original key, the one father carried, to keep it from being stolen. Visitors used to take books from the shelves and pictures from the walls. It's a wonder they didn't take a door or two. Of course they couldn't get the heavy pieces of furniture father made under their coats, so we've still got 'em!"

WILD FLOWERS ARE HIS FRIENDS

(Continued from page 210)

comment from the Science Museum Library, London, England: "This important original volume is most attractively written, beautifully illustrated and unusually comprehensive in its scope."

The fame of Dr. Harned's book has even penetrated the Iron Curtain, as evidenced by a courteous letter from the chief of the Bureau of Introduction, Institute of Plant Industry of the Lenin Academy of Agricultural Sciences asking for seeds or roots of the *Apocynum* plant, commonly known as dogbane or Indian hemp." While he has no desire to aid the seeds of Communism, Dr. Harned sent the packet of *Apocynum* seeds in the interest of science.

Dr. Harned's scientific knowledge has brought him the friendship of the great, as well as the near great. Once Albert Einstein discussed the plant life of the region with him. When they parted, the botanist presented Einstein with a copy of his book. The latter, who was on a camping trip, was so delighted and interested in the book that he sat up all night reading it.

Thomas Edison, Henry Ford, Harvey Firestone and John Burroughs camped at Muddy Creek Falls, near Oakland, Maryland, one year, and while there, they visited Dr. Harned's store. Edison was so impressed with the latter's knowledge that he later returned for a private discussion with him on the area's plant life in connection with some experiments Edison was making in Florida in an effort to discover a source of domestic rubber. Subsequently, Dr. Harned visited Edison's New Jersey home.

In 1948, West Virginia Wesleyan College conferred the degree of Doctor of Science on the druggist-botanist, and the next year Western Maryland College accorded him the same honor.

Joseph Harned, one time friend of Edward Bok and George W. Childs, a former editor of the old *Philadelphia Ledger*, has never lost his sense of humor or his fine feeling for human and spiritual values. His personal life has matched his scientific and pharmaceutical achievements. In September, 1950, Dr. Harned and his wife, the former Emma M. Bauer, celebrated their 57th wedding anniversary. Dr. Harned has two children — a son, Harold H. Harned, who has assisted his father as a pharmacist for twenty-five years, and a daughter, Annie Louise, now Mrs. Hubert Burdette. There are also two grandchildren — Kenneth Burdette and Helen Louise Harned.

In spite of his honors, Dr. Harned, a deeply religious man, has found time to take an active part in church matters, and in Rotary, of which he is a local past president. He was elected to a fellowship in the American Association for the Advancement of Science and the Maryland Academy of Science, and is a member of The American Nature Association and the National Wild Flower Preservation Society.

Although Dr. Harned, now eighty, works a shortened day of only twelve

hours, he still finds time to give talks before garden and Nature clubs, and to spend a little time each day making notes on the illustrated guide to wild flowers he is going to publish some day. He even took part in a seven-reel movie inspired by his book.

Dr. Harned believes that a hobby is a good preventive against mental depression, and that many people would be much happier if they were to get out into the country and cultivate a Nature hobby of some kind. And nothing pleases him more than to hand the torch of enthusiasm for wild flowers to another.

Referring to his own book, Dr. Harned says, "The book speaks for itself. Into it I put the best part of my life, largely as a hobby, but certainly a delightfully pleasant one, and one that has helped to keep me young, even as I reach my 80th year. I am still very active and am still greatly interested in Nature's wild flowers."

In his dedication of his book to his mother, more than anywhere else, is revealed Dr. Harned's love of flowers and his gratitude to his mother for teaching him "to await with fond expectancy the appearance of the first blossoms as they gracefully unfolded their petals to the stimulating rays of a brilliant sunshine; to follow the marvelous development of flower-life through all stages until fruition was fully accomplished.

"To her companionship during the impressionable years of my life, her fervent admiration of things true, and things beautiful, I owe my great interest in Nature and my belief in Nature's God."

EARTH-MOON SYSTEM

(Continued from page 212)

in the southern hemisphere, where great walled plains and large craters, showing signs of great age, have been encroached upon by countless new and smaller craters. On the sides of craters and on the floors of the so-called seas are numberless crater pits, or crater cones, some of them extending to considerable distances in rows or chains. Whatever volcanic action may still take place on the moon is not of great explosive violence, as it was undoubtedly in past ages, if one is to believe in the volcanic origin of the lunar craters; but rather of the nature of emanations or exhalations from these smallest of lunar markings. Tops of crater cones are in some instances covered with a nimbus or haze that seems to indicate that mild eruptions still are taking place on a small scale.

Mountains form the borders of many of the lunar seas and are evidently of igneous origin and surmounted by many sharp peaks, some of them 15,000 to 20,000 feet or more in height. Loftiest of all the lunar mountains are the Leibnitz and Doerfel ranges with some peaks 26,000 feet or more in height. They lie along the southern limb of the moon, extending even beyond the edge into the great unknown and unseen portion of the lunar surface.

There are two conflicting theories of the origin of the lunar craters. According to one theory they are the product of volcanic action that occurred on a great scale when the moon was first being formed, either from the earth, by fission, or as a result of some explosive force that sent the material of which it is formed spiraling out into space. According to the meteoric theory of the origin of the lunar craters, our satellite was bombarded, in the days when meteoric masses were far greater in size and more plentiful than they are today, by many huge meteorites that left permanent scars on the face of the moon in the form of these characteristic craters. Although the earth doubtless experienced similar encounters, soil erosion would have much to do with destroying the traces, and the presence of a dense atmosphere and vast expanses of water would have helped in their destruction.

One should not fail to look for the planet Mercury this month for it is at this time of year that it is seen to best advantage in the evening sky. Mercury will be at greatest eastern elongation on April 5, and from the first of April until a week or more after elongation one should be able to pick it up easily in the western evening sky soon after sunset. Mercury will be in conjunction with Mars on April 18, but both planets will then be too close to the sun to be seen. Mars is now rapidly approaching the sun and will disappear from the evening sky next month.

Venus is now a fine evening star, conspicuous in the western sky all of the month. Jupiter is now in the morning sky, in Pisces, but is too close to the sun to be easily observed, although it may be seen not far above the eastern horizon at sunrise by the end of the month.

Saturn is now in the constellation of Virgo and is west of Spica. It is well above the eastern horizon at sunset and visible most of the night.

North Dakota Plants

Handbook of North Dakota Plants. By O. A. Stevens. Fargo, North Dakota. 1950. North Dakota Agricultural College. 324 pages. Illustrated. $4.50.

Orin Stevens is Professor of Botany at North Dakota Agricultural College, and forty years in that State have given him an intimate acquaintance with its plant life. While this book will be most useful to teachers and to others who have a good knowledge of plant life, the author has attempted to keep terminology as simple as possible, and thus broaden the usefulness of this work. All plants that are known to occur in North Dakota in wild condition, whether native or introduced, are included. Keys are supplied and an excellent index adds to the usefulness of Dr. Stevens' excellent contribution to local botany.

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INDIA'S CONSERVATIONIST EMPEROR

(Continued from page 204)

granted full protection were given the benefit of closed seasons. The same edict specifies certain days on which fish could not be caught or sold — days which, according to Smith's calculations, amounted to 56 in the year. On these same days, in elephant-forests and fish-ponds, the destruction of all animals of whatever class was also prohibited.

This same comprehensive edict declares that forests must not be set on fire, either wantonly or for the destruction of life. This decree was apparently intended to abolish the widespread custom of driving the forest animals into the open for slaughter. The chaff from the threshing floors was not to be burned, because this would destroy the living things in it — and at the same time, we may add, waste organic matter that should be returned to the soil. Another stipulation of this royal decree was that the living must not be fed with the living. The branding of horses and oxen, the castration of bulls, rams, goats, boars, and other animals, was prohibited on a number of specified days. The Emperor evidently disapproved of these practices yet believed it unwise to prohibit them entirely. But the caponing of cocks, less necessary for farm management, was totally forbidden.

Asoka by no means limited to prohibitions his efforts to bring happiness to all the living things within his immense realm. In his Seventh Pillar Edict, His Majesty declared: "On the roads, too, I have had banyan-trees planted to give shade to man and beast; groves of mango-trees I have had planted; at every half-*kos* I have had wells dug; rest-houses, too, have been erected; and numerous watering-places have been provided by me here and there for the enjoyment of man and beast." And in the Second Rock Edict, the Emperor told of his "healing arrangements [hospitals?] for men and healing arrangements for beasts." Medicinal herbs for both men and beasts, wherever lacking, were both imported and planted. Roots and fruits were likewise imported and planted wherever necessary.

For the enforcement, over about two million square miles of territory, of these laws directed toward "the growth of piety among men and the more complete abstention from killing animate beings and from the sacrificial slaughter of living creatures," Aoka appointed many High Officers of the Law of Piety. These officials, whose duties comprised those of ancient Roman censors along with those of modern game wardens, were charged among other things with the distribution of alms, vigilance in matters affecting the church and the welfare of Brahmans and ascetics, and the interests of householders. By these measures the Emperor hoped, to use his own words, to foment practices "whereby compassion, liberality, truth, purity, gentleness, and saintliness will . . . grow among mankind."

There was something wholly modern, almost Yankee, in Asoka's insistence, often reiterated in the inscriptions, that small and great should exert themselves, as, according to his own admission indelibly engraved in the hard rock, he himself had exerted himself strenuously. For him, as more than twenty centuries later for his compatriot Gandhi, religion was not mere passive contemplation, but active endeavor to improve the lot, not only of mankind, but of all animate creatures. That he, indeed, strenuously exerted himself there is abundant evidence. He found Buddhism a small local sect, and by sending missionaries far and wide, even to distant Cyrene in northern Africa, laid the foundations for its growth as a world religion. He was so eager to advance the welfare of his people that he issued a proclamation stating that he would at all hours be accessible for the transaction of the public business. How clearly he reveals himself as he speaks to us across the centuries with these words chiselled in the rock at his command: "So by me the arrangement has been made that at all times, when I am eating, or in the ladies' apartments, or in my private room, or in the stables and cowsheads, or in my (?) conveyance, or in the pleasure-grounds, everywhere the persons appointed to give information should keep me informed about the affairs of the people" For a conscientious man, ruling an empire can be a strenuous business, allowing little repose and scant privacy. Asoka died in 232 B.C., after reigning 41 years.

Zeal for a cause so intense as Asoka displayed is all too likely to lead to a narrow and intolerant fanaticism, yet happily he avoided this blemish. "I devote my attention," he declared in the Sixth Pillar Edict, "to all communities, because all denominations are reverenced by me with various forms of reverence. Nevertheless, personal adherence to one's own creed is the chief thing, in my opinion." And again in the Twelfth Rock Edict: "The sects of other people all deserve reverence for one reason or another. By thus acting, a man exalts his own sect, and at the same time does service to the sects of other people. By acting contrariwise a man hurts his own sect, and does disservice to the sects of other people."

The foregoing quotations from the edicts make it plain that the motive behind Asoka's conservation policy was wholly distinct from that which inspires most of our own. In general, twentieth century conservation measures are undertaken, not for the sake of the things conserved, but to safeguard our own interests, economic or otherwise. We protect the forests not out of consideration for the animals that dwell in them, but to preserve our sources of lumber. We spend millions to increase the propagation of waterfowl and other animals, not for the welfare of these creatures themselves, but in order to have something living to shoot. So far as the available records give evidence, Asoka was not influenced by economic considerations; he preserved the creatures of his dominions for their own sake, not for subsequent exploitation by mankind. He made it abundantly clear that he reigned to give happiness to both man and beast.

Whatever the motives inspiring conservation may be, the results are to a certain extent the same. If we preserve the forests to protect watersheds and ensure a continuing supply of lumber, free creatures will find refuge in them; if we prevent fires so as not to destroy the animals that dwell in the woodland, we incidentally conserve watersheds and save trees for lumber. To guard natural societies of animals and plants as sources of future wealth is enlightened self-interest, without which our descendants may disappear from the earth. Such a policy insures the continued existence of men as economic units. But Asoka's kind of conservation reveals a more enlightened interest, for it was founded upon a philosophy that viewed men and other creatures as something more than economic units, whose welfare was not to be measured in terms of wealth and survival alone. Clearly we can learn much from the teachings of this king who reigned so far away and long ago, both in our dealing with our fellow men and our treatment of other forms of life.

Editors Note: The following quotations from Buddha, as compiled by E. M. Bowden for his *The Essence of Buddhism*, have been called to our attention by W. L. McAtee, with the suggestion that there might be an appropriate corner in *Nature Magazine* for them. It would seem that here, immediately following Dr. Skutch's splendid article, would be the appropriate corner. We quote from Buddha, from whom Emperor Asoka drew inspiration, as follows:

"Ofttimes while he mused—the squirrel leaped
Upon his knee, the timid quail led forth
Her brood between his feet, and blue doves pecked
The rice-grains from the bowl beside his hand."

"He cherished the feeling of affection for all beings as if they were his only son."

"Filled with compassion for all creatures"

"Every variety of living creature I must ever defend from harm"

"Whoso hurts not living creatures, whether those that tremble or those that are strong, nor yet kills or causes to be killed, him do I call a good man."

"Whosoever . . . harms living beings. . . and in whom there is no compassion for them, let us know such as base-born."

"All beings desire happiness; therefore to all extend your benevolence."

"Loving all things that live even as themselves."

"Be kind to all that lives."

WILD PLUMS ARE REAL AMERICANS

(Continued from page 207)

River on the Iowa prairie, where I lived for a few years as a small child.

By that time Iowa had plenty of fruit trees. But my great-aunt had been a pioneer, and the "old settlers" still liked to go to the river bottoms and gather "wild plums" — perhaps with a sad-sweet nostalgia for the old days, which, though difficult, had been in that halcyon time when they were young and their new world was full of hope and promise.

In the pioneer days wild plums, berries, grapes and nuts were eagerly sought out. Even in the later days of orderly orchards, wild plum butter, wild plum preserves, and spiced wild plums had an honored place at many a county fair and on every thrifty housewife's shelves. These plums have a wild, sharp, tangy flavor in preserves that the more perfect, cultivated fruit somehow lacks. And how good they tasted, on a small maid's bread and butter, or with meats, on some wintry day when blizzards howled across the bleak prairies!

But long before the prairie pioneers were eagerly gathering their wild plums, a beach, or shore plum, *Prunus maritima*, found growing on the beaches and sand dunes along the coast from Maine to Virginia had been popular from Colonial times down and still is, today. What a zest its fine jellies and preserves must have added to the wild venison, wild turkey, and other game! In Massachusetts beach plum jellies are still something special.

This plum is variable in many ways — in size, ranging from a low and straggling shrub to several feet in height; in shape, in thorniness, in profusion and size of bloom; in the size, shape, color and texture of fruits; in its resistance to disease and attraction for Japanese beetles.

Although not found very many miles inland, it can be cultivated inland and the New Jersey Experiment Station, experimenting with some of the forms found along its coast, has developed two varieties that can be bought as budded trees. Too, the beach plum is sometimes cultivated for its flower profusion in early spring and its colorful fruits, ranging from crimson to deep purple and covered with a heavy bloom.

Spring, summer, autumn winter — the wild plums offer interest and beauty and use.

Young Scientists

Interest in the natural sciences bulked larger than ever before among the forty high school seniors who were selected as finalists in the annual Westinghouse Science Talent Search. These interests covered such varied subjects as glaciers, the Pacific pond turtle, water pollution, polyembros in pepper seeds, mollusks, life in a fresh-water pond, the North American beaver, flour beetles, nesting and feeding habits of birds, and cave formations.

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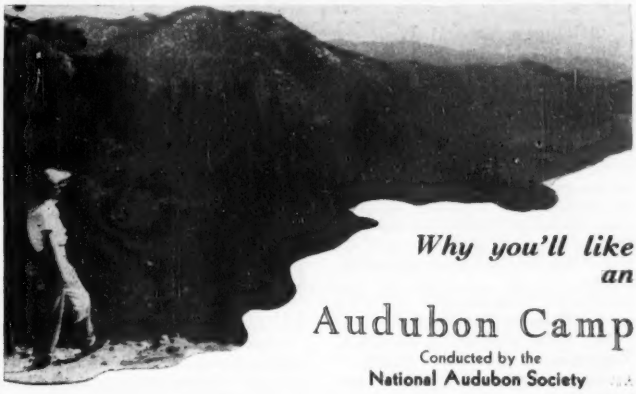

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Newton Drury Resigns

Announcement is made by Oscar L. Chapman, Secretary of the Interior, that Newton B. Drury has resigned, effective April 1, as Director of the National Park Service. He also announced that Arthur E. Demaray has been advanced from the post of associate director to that of director; that Conrad L. Wirth will be advanced from assistant director to associate director; that Ronald F. Lee has been promoted from chief of the history division to be assistant director.

Mr. Drury was appointed director of National Park Service by Secretary of the Interior Harold L. Ickes in August, 1940, coming to that post from the office of executive secretary of the Save-the-Redwoods League, which position he had held for 21 years. Mr. Demaray entered the service of the Department of the Interior as a messenger in 1903, and has been with the National Park Service for thirty-three years, and has been honored, as has Mr. Drury, for distinguished service to National Parks.

Mr. Wirth joined the National Park Service in 1931 as assistant director in charge of the Branch of Lands, directed the Civilian Conservation Corps work as it affected National Parks, and directed the park, parkway and recreational area survey authorized by Congress in 1936. Mr. Lee joined the National Park Service in 1933, organized the National Historic Sites Survey, and, in 1938, became chief of the Branch of Historic Sites and Buildings, now the History Division.

Michigan Natural Areas

One of the most interesting conservation projects on a State-wide basis is that being carried on by the Michigan Botanical Club in an endeavor to have set aside some typical primitive areas in Michigan before it is too late. Originally sponsored by the Michigan Botanical Club, this effort has grown into a Natural Areas Council representative of several organizations. Genevieve Gillette, 715 Lawrence St., Ann Arbor, Michigan, is the spark-plug of this move and can supply further details.

History of Forestry

Fifty Years of Forestry in the U.S.A. Washington, D. C. 1951. Society of American Foresters. 370 pages. Illustrated. $4.00.

Nineteen eminent foresters, all of whom observed and contributed to the forestry movement during the first half of the 20th Century, have joined in producing this important and authoritative volume. It was compiled under the guidance of the Committee on History of Forestry of the Society of American Foresters. Among the subjects treated are forest protection, silviculture, forest management, forest utilization, range management, wildlife management, and forest influences. Lyle F. Watts, Chief of the U. S. Forest Service, and William B. Greeley, former Chief, are among the contributors.

Audubon Stamps

As an observance of the centennial of the death of John James Audubon, the National Audubon Society, 1000 Fifth Avenue, New York 28, N. Y., has issued a sheet of full-color, miniature reproductions of twenty-three of Audubon's paintings and a picture of the artist-naturalist. The pictures are about two by three inches in size and are sold at a price of one dollar for two sets. Audubon's bird portraits have never before been reproduced in stamp form.

LIBRARY BIRD HOUSES

Juncos, chickadees, jays, robins, and English sparrows are common visitors to a tiny mid-block, mid-town garden behind the Montclair Library's main building in downtown Montclair, New Jersey. A wide elm-shaded lawn in front of a school across from the Library hoards orioles. Now the Library hopes to lure, if not the orioles, at least more chickadees, and perhaps an occasional nuthatch, downy woodpecker, or even one of the cardinals some of the small residence gardens a couple of blocks away enjoy. Two bird feeding stations and a nesting box were given the Library this winter by Troop 12 of the Montclair Boy Scouts.

The Wolf and Honor Patrols attended, in uniform, the presentation ceremonies at the Library, with George Gaun presiding. He and his brother Bob had built the gifts. The Library had arranged a display of fine bird books, and had gotten George Regensburg, of Montclair State Teachers College, to bring his exceptionally fine color pictures of wildlife in New Jersey to the Library to show to the boys. Miss Margery Quigley, of the Montclair Library, received the gift.

Chief Forester Reports

Lyle F. Watts, Chief of the United States Forest Service, in his annual report to the Secretary of Agriculture, records notable gains in private forestry during the past ten years. Emphasizing the fact that three-fourths of the commercial forest land in the United States is privately owned, he says that the nation must look to private owners for the bulk of the forest production. This means that constructive forestry practices must be applied by the several million small owners, and these owners are in the greatest need of assistance from State and Federal governments and private industry. Mr. Watts also emphasized the importance of multiple uses of forest land in supplying local industry, furnishing raw materials, safeguarding water supplies, reducing flood threats and offering opportunity for recreation. Forest tree planting has grown tremendously since World War II, thanks in large measure to the national campaign of American Forest Products Industries. Mr. Watts urged that the effort be doubled and that a billion trees a year be planted on a million acres.

Wildlife Stamps

Proponents of recognition on our postage stamps of wildlife in the United States may find inspiration in the action of the Canadian postal administration. Canadian artists have been invited to submit designs for new stamps, including wild flowers and larger mammals. Artists are offered $300 for designs accepted. Ten new stamps have also been issued by the Portuguese colony of Timor, all ten of them picturing native flowers.

Duck Stamp

Two gadwall ducks jumping from a pond have been chosen as the design for the Migratory Bird Hunting Stamp, or "duck stamp," for 1951-52. The artist is Maynard Reece of Des Moines, Iowa, whose design of three buffle-head ducks was chosen for the 1948-49 stamp. A total of 74 designs were submitted by 51 contestants.

National Forest Revenue

Income from the national forests during the last six months of 1950 reached a new high of $27,076,956, according to a report from the U. S. Forest Service. This is an increase of nearly 70 percent over the receipts for the same period in 1949. Greatest gains were from the sale of saw timber, pulpwood, fuel wood and naval stores.

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UNDER THE MICROSCOPE

By JULIAN D. CORRINGTON

CONSERVATION AND MAGNIFICATION

ONE OF our correspondents questions if it would be possible for us to write an entire article and never once mention the micro-,- the instrument that magnifies. Of course we can. What a silly notion! We shall choose a subject that has nothing to do with the mi-,- with the magnifying instrument. What could be more foreign to the laboratory and to the micr-,- to the mechanism for producing enlarged images in the laboratory, — than conservation?

The educated and informed person hears about conservation on all sides. One of the primary reasons for the existence of the American Nature Association, and accordingly of this magazine you are now reading, is that of furthering the principles and practices of conservation of our natural resources. Other organizations and publications also play their part in keeping this matter before the American public, although unfortunately little or none of this effort reaches a stratum most badly in need of it — the illiterate, the ignorant, the poor, and above all the vast group who never read anything worth while. National and State agencies, the press, books, journals, courses in universities and exercises in public schools all strive to teach the urgent and imperative lesson of utilizing our water, soil, minerals, forests, and wildlife is such manners as to insure their continuation.

But conservation is to be undertaken by the engineer and the field naturalist in their high leather boots, armed with shovels, tackle, collecting equipment, and outfitted with boat and camping paraphernalia. This is not the subject and the situation for the laboratory, with its unmentionable instrument.

Using a bit and brace to obtain a sample of soil.

Take water, for example, that priceless boon we never appreciate until the moment arrives when we do not have it. The conservationist is concerned with the way in which vegetation prevents a rapid runoff of rainwater, the gullying of denuded areas, contour plowing, the impounding of water for agricultural, industrial, and recreational purposes, pollution by factories and sewage. Each area has its own problems, from the vast Commonwealth of Australia, with water shortage on a grand scale, to Farmer Simpson's irrigation requirements. The difficulties are many and varied. If the City of Winchester dumps its raw sewage into the river, can Mansfield, only five miles further down, use this stream as a source of drinking water? They say impurities, including bacteria, settle out in that distance, but can you be sure? There were some cases of typhoid in Mansfield last summer, and some people blamed it on the water, while others said it came from a certain dairy.

So samples are collected and tested in the public health laboratory at Winchester. They run a couple of analyses and a technician examines specimens under the micr—, whoa up there — doggone it, we almost lost that round! To be sure, water will *have* to be studied under magnification for many purposes; in fact, we found quite a list of references at the library on the m-cr-sc-py of drinking water for, after all, the potable variety of H_2O is, in the last analysis, the final problem in conservation.

Possibly soil conservation is a safer topic for us at this time. In addition to knowing what to do to keep water from carrying his soil away, your modern farmer must learn what to put back into his soils that the plants have removed, in order to grow next year's crops. Fertilizers play an important part. Before applying them indiscriminately, however, it is well to know the character of the particular soil and what it needs in order to grow specified crops. So the farmer submits samples of his soils to the state, or university, or other laboratory, and they advise him on these points. Soils and climates suitable for sugarcane are not at all appropriate for wheat, as everyone knows.

Now the specialists at the laboratory conduct numerous tests on the soil samples. Small amounts are examined under the mi- — oh well, all right, — the MICROSCOPE! We know when we are licked, and we might just as well take it gracefully, and get on with the story. Of course soils must be examined microscopically; how else would you think their content and character could be determined? And you would not believe the tales that soil particles can tell to the experienced observer — that is, not unless you happened to own a microscope and had looked at some specimens yourself.

Soil is decayed rock, and its appearance and composition will vary with the sort of rock from which derived. That rock may be local and the soil formed in place — residual soil; or the source may be many, even hundreds of miles distant, the soil having been transported, particle by particle, then deposited. Quartz crystals, weathered out of granite, for example, form sand, while silicates of aluminum make clay. Loam is a mixture of the two, easily recognized under magnification, for the clay particles are much finer than sand. To qualify technically as a sand grain, the particle must fall between arbitrary size limits, from 2 mm to 1/16 mm; larger ones are termed gravel, smaller ones silt. The larger grains, transported by rivers or rolled by the incessant breakers of the sea beach, become rounded, with sharp angles and corners worn off, but the smaller grains are protected by a buffer action of the film of water surrounding each, and remain angular. Dune and desert sands roll over and over one another as they are tumbled along by the

Ocean beach sand from Asbury Park, New Jersey. 13X.

A mold, *Aspergillus*. Known as "weed mold" because it is so universal. 30X.

wind, and become perfectly rounded in time. In general, river sands are the most angular, ocean sands intermediate, and wind-blown sands the most rounded.

Then there is composition and proportion of ingredients. Monazite sand contains significant amounts of this thorium-bearing mineral; magnetite sand includes black grains of this iron ore that will respond to a magnet; garnet sand has many small garnets, making it especially useful as an abrasive. Materials transported by wind or water are assorted in size — the spring freshet, tearing down a steep declivity, can carry boulders, but as the stream levels off, deepens, and flows less tumultuously, the boulders are dropped and only cobbles and pebbles and lesser stuff are swept along. Then the cobbles fall to the bottom, later the pebbles, and, in the quieter waters, the sands, silts, and muds will continue on to their ultimate assortment. One location will have only one kind of homogeneous deposit. A glacier, on the other hand, sweeps all before it, regardless of size. A vast ice sheet can carry a huge boulder or a speck of mud with equal indifference, and when the glacier melts, everything is dropped in a heterogeneous jumble — boulders, pebbles, sand and mud dumped as a conglomeration called glacial till — conclusive evidence of the method of transportation. Soils can travel, then, and a microscope aids the eye in deciphering some of the features of the journey.

Minerals require specific indentification as the first step in their conservation. There are numerous tests, including blowpipe analysis, hardness as proved by trying to scratch the substance with known minerals forming a scale of hardness, from talc to diamond, tests of fluorescence, and others. But the determination of the crystal system to which the mineral belongs by means of a polarizing microscope, then the further narrowing of the identification with this instrument, is a prime essential. Especially is this true of the microcrystals occurring in soils, where this microscope is required in determining the refractive indices, another means of identification.

Nearly all forms of living things require conservation at some time or place. We are not aware of any such necessity in the case of the starfish, a serious pest on oyster beds, but the related sea cucumber is an esteemed item of food, under the name of *beche de mer* or trepang; and at the present rate of capture there is going to be an acute shortage of rattlesnakes in Florida within a few years. Then where will we procure the venom for the manufacture of antivenin to cure the bites from the snakes that are no longer there? But the microscope? Yes indeed! Take the important work in fish propagation and culture; studies on the milt, eggs, larvae and fingerlings, scale counts, growth ring counts, and other determinations on the fish themselves are daily tasks. Then there is the question of feeding. Is the right food present in sufficient quantity in the waters to which the fingerlings are to be transferred? How about the protozoan fauna of these waters? Are the species useful in a food chain or harmful as pathogens or fouling organisms? How about *Daphnia*, *Cyclops*, and Co., those essential microcrustacea that provide a chief item of the piscine menu? Fungus growths may constitute a major problem. Are there molds in the water? What enemies are present as predators or parasites? Insect larvae may be so abundant as to present a serious menace; few small fish have any chance against an overpopulation of dragonfly nymphs and diving bettle larvae. All of this information and much more depends on the microscope, the preferred laboratory form often being the wide-field binocular, while the field worker needs a good pocket lens and sometimes a folding or portable variety of compound instrument.

And so it is with all species that man wishes to save. At the least, with the larger animals, as mink, otter, crane, or duck, the microscope must be called in on questions of food and diseases. To conserve a desirable species it is usually necessary to destroy or control one or more undesirable types, and scientific studies are needed as much for the one as the other. Nor is this any less true for plants. The blights, rusts, and other plant pathogens; the galls, borers, and other insect pests; the character of the soil and the possible mycorrhizae or symbiotic soil fungi associated with certain plant roots — these all pose problems requiring the microscopist. And even the lecturer who brings you the latest information in this subject, via the talk illustrated with lantern slides and motion picture films of the great outdoors and what we are doing to maintain it, is only able to put over his message by use of still another form of microscope — the projection machine.

HISTORICAL OUTLINE

WHILE observations of parasites antedate recorded history, the first published account of one of the most basic laws in parasitology — and one necessary for an understanding of the nature of many worm parasites — was not forthcoming until modern times. Then, strangely enough, this study was made by a man classed first as a poet and secondly as a botanist, and upon a non-parasitic marine invertebrate animal!

Louis Charles Adelaide de Chamisso de Boncourt, poet and naturalist, was born in Boncourt Castle, Champagne, France, in 1781. When the French Revolution broke, the family fled to Berlin, and there young Chamisso grew up, being at one time a page to the Queen of Prussia, later an officer in the army. In 1803 we find him as co-founder of the *Berliner Musenalmanach*, containing his first poems. The venture failed, but served to introduce

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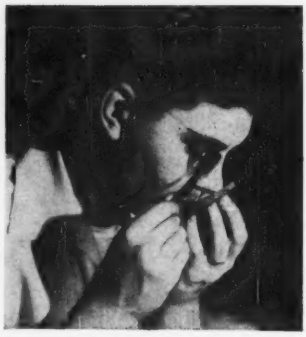
him to the literary world. Now and henceforth he was known as a German, Adelbert von Chamisso. Leaving army life, he for a while joined the coterie of Mme. de Staël, accompanying her to Switzerland when she was exiled.

In 1813 appeared his best known literary work, *Peter Schlemihl*, the story of the man who sold his shadow. It was widely translated. In 1815 he was appointed botanist for an expedition searching for the Northwest Passage and circumnavigating the globe, on the Russian ship *Rurik*, under Otto von Kotzebue. Chamisso's diary of the voyage, *Tagebuch*, was published in 1821, and in 1827 he issued, as titled in English, *Views and Remarks on a Voyage of Discovery* and *Description of a Voyage Round the World*.

After returning from his travels he was, in 1818, made custodian of the Berlin botanical gardens. Beginning in 1829, and continuing until his death in 1838, he published the *Deutsche Musenalmanach*, which carried most of his later poems. The first collection of his works appeared in 6 volumes in 1836 and ran through numerous later editions. Chamisso's career has within it various elements that remind one, in a minor key, of certain of the immortals. His voyage and diary, with specific biological discoveries, foreshadow Darwin and his *Voyage of the Beagle*. The mingling of literature and science, with posterity valuing the former much more than the latter, parallel the career of Goethe, as also Chamisso's many lovely ballads and songs; and much of his poetry recalls Poe, with its "grim, ghoulish, and ghastly" treatment, alleviated with occasional outbursts of humor.

On his voyage of circumnavigation, Chamisso studied whatever crossed his path, and among such were members of the genus *Salpa*, free-swimming, transparent, marine tunicates that are common in tropical waters. In this group each species exists as two kinds of individuals, and *reproduction results in an alternation of generations*. There is a barrel-shaped solitary creature that, by internal budding, produces a chain of spindle-shaped animals that remain attached. Each member of this cluster reproduces hermaphroditically, usually with a single egg, which develops into the solitary barrel-shaped person. Neither type can give rise to others like itself, but only to the other kind, the two generations thus alternating, one reproducing asexually, the other sexually.

It is strange indeed that this phenomenon, so widely known today among cœlenterates and flukes and tapeworms, should have first been noted in an obscure chordate. Yet this discovery of Chamisso's, although he did not appreciate or foresee its general application, was to prove to be the key to unlock the mystery in the lives of most parasitic worms and disprove the old belief that these pests arose in the host's body by spontaneous generation.



NEW MAGNIFIER

THE accompanying illustration shows the new Buhl 10X Hastings Triplet Magnifier in use. It has a focal length of 1 inch and a wide field of ¾ inch. The lens system is made of three cemented components and is corrected for spherical and chromatic aberrations. The mounting is a simple anodized aluminum cell with removable handle, making for light weight, good looks, and convenience. Price, $10.75.

This is one of a number of Buhl instruments primarily intended for shop use, but equally serviceable to the biologist, geologist, or other specialist requiring simple microscopes. They also produce a folding triplet for attachment to the watch or key chain, a focusing magnifier, wide-field microscope, pocket microscope, desk magnifier, and other models. For ordering or further information write the Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.

REVIEWS

Physiology

A BOOK that covers the field adequately within reasonably small compass is the second edition of Dr. Miriam Scott Lucas' (Michigan State) *Elements of Human Physiology*. The size will not affright the student nor the cost wreck his purse; the writing is factual, authoritative, and up to the minute; the coverage ample for those for whom the book is written — all save medical and research students; the illustrations, while mostly borrowed, are well selected as essential parts of explanations; and the format is handsome. For biology students, nurses, teachers, the layman, and fine also for reviewing by rusty professionals. In spite of the title, this is both an anatomy and a physiology. Pp. 357, figs. 158. Lea & Febiger, 600 Washington Sq., Philadelphia 6, 1950. $4.75.

Conservation

GUY-HAROLD Smith, head of the Department of Geography at Ohio State University, is the editor and part author of *Conservation of Natural Resources*, written by twenty outstanding authorities and based on the second edition of Parkins and Whitaker, *Our National Resources and Their Conservation*. Most of the material and illustrations are new, hence the new title. This book is most timely and should fill a rapidly growing demand. There are eight Parts: history, soil, forests, water, minerals, wildlife and fisheries, recreation, and local, state, and national planning.

This is the story of conservation in America, past and present, and what can be done about the future. For each resource, the geographical and conservational facts are given, followed by the extent, distribution, and use of the resource, the natural and human factors that have made themselves manifest, and the practices needed to assure a sound future. Beautifully printed and illustrated, two columns per page, with bibliography and index; every school and college library throughout the land should stock an adequate number of this title. Pp. xii, 552; tables 44, photos 108, maps 46, graphs, charts, and drawings 28. John Wiley & Sons, Inc., 440 4th Ave., New York 16, 1950. $6.00.

WHAT NEXT WITH TV?

A RECENT issue of *Life* featured special costumes for reclining on the floor and viewing television in style and comfort. The crowning achievement in TV accessories, though, has been announced by Bausch & Lomb, in their *Tele-Ban Glasses*, "made from an absorptive type of glass designed especially to reduce glare, make pictures sharper, and minimize eye fatigue." They are being field-tested by hundreds of TV set owners, and it is said that these pale yellow lenses permit all-evening viewing without discomfort.

NEW EYE CAMERA

ON JANUARY 17, at the Cornell University Medical College in New York City, a new high-speed retinal camera was demonstrated for the first time in America by Bausch & Lomb. The premier showing was held last summer at the 16th International Congress on Ophthalmology in London.

"Photographs of the interior of the eye," explained Howard E. Trimby, manager of the firm's Ophthalmic Instrument Division, "are of utmost value as a diagnostic aid in revealing certain systemic diseases such as arteriosclerosis, diabetes, nephritis, and tumors of the central nervous system before the appearance of clinical symptoms. Such photographs also provide documentary evidence of such eye pathologies as abnormal condition of the blood vessels, location and extent of pigmentation, and the extent of cupping of the nerve head." The latter is important in diagnosis of glaucoma, which causes 12 percent of all blindness. Photographs in black and white or in color of the interior of the eye may be enlarged many times or projected onto a screen for scrutiny by surgeons, both before and after operations, or used as visual aids in teaching medical and optometric students.

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"Where's the latest copy of Nature Magazine?" How often you have heard that question! And how often an answer like this: "Look on the chair . . . over in the corner!" Like as not, the much desired copy will turn up under the cushion in the window seat. And great will be the lament at torn pages and creased pictures.

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